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Car and Driver. vol. 62, no. 5

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—ERIC TINGWALL, "THE PROPHET"

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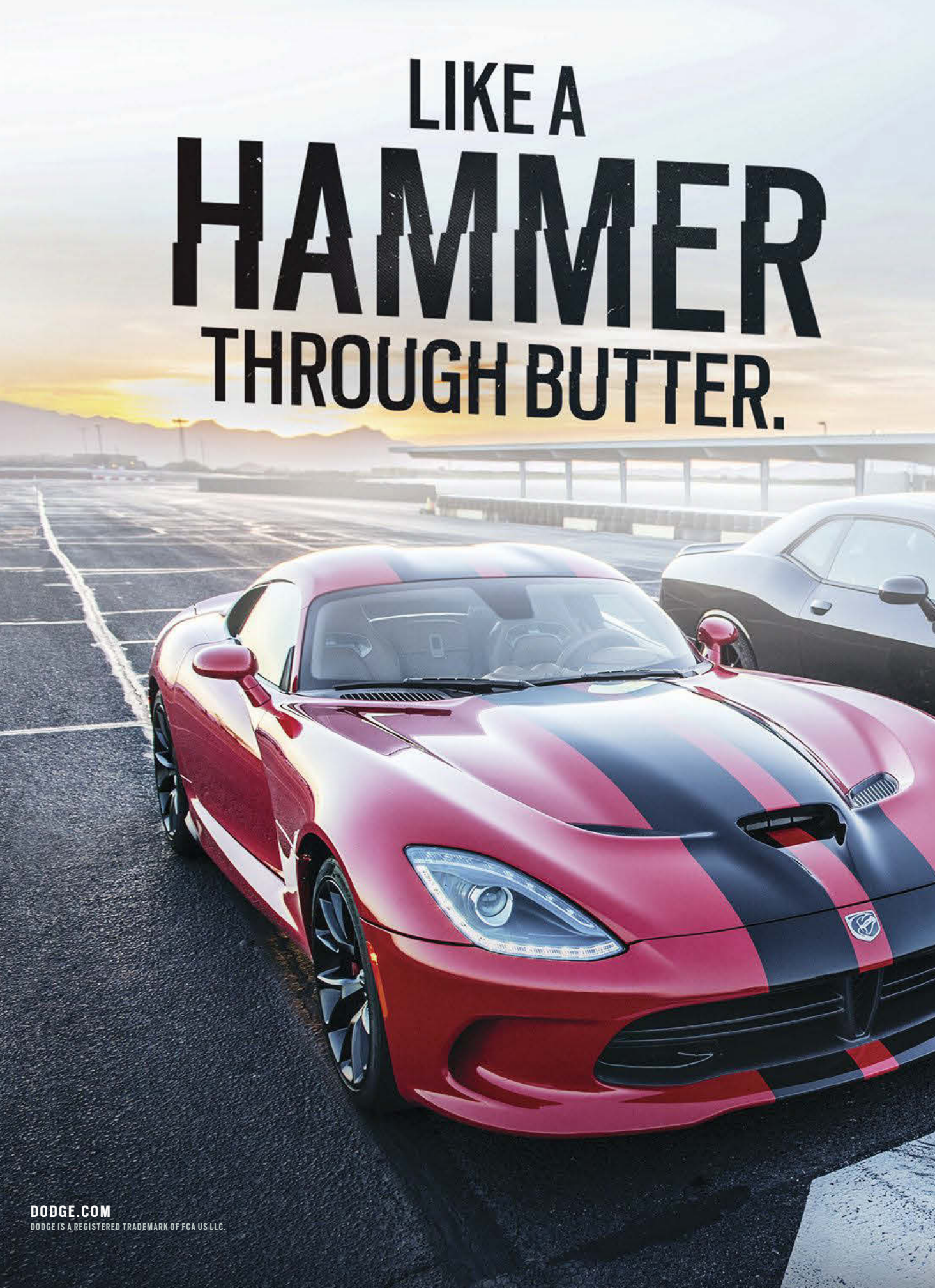
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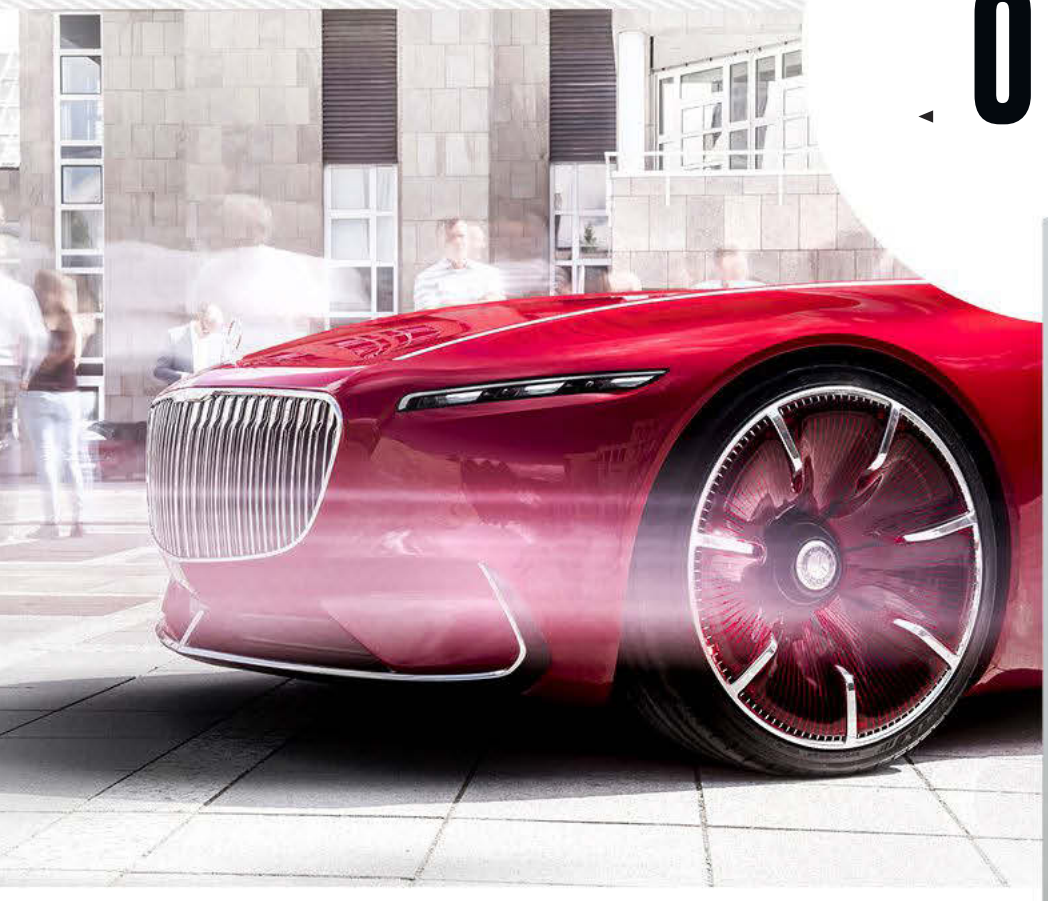

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Backfires:
The joyful noise of the commentariat, rebutted sporadically by Ed.

ROMEO AND GIULIA

As someone who drove my father's wonderful (if ugly) 1967 Alfa Romeo Giulia Super to school many a time before it disintegrated into a rust pile, I was excited to read your article on "11 things you need to know" about the new Giulia ["Is the Wait Finally Over?" August 2016]. It seems like a great car, and this time it is beautiful. I wish Alfa well. However, I was dismayed that you got an important fact in the article so wrong. The name "Quadrifoglio" does not mean "cloverleaf," as stated in the answer to your first question. Quadrifoglio means "four leaf," as in four-leaf clover.

—Mario Jorquera
Columbia, MD

In the first instance, we are referring to the Quadrifoglio logo, sometimes called the "Cloverleaf" by* Alfisti. *A couple of pages later we use the correct literal definition: "four-leaf clover"—Ed.

6, 8, 10

Enjoyed the "Junior Achievement" article in the August issue. Have you ever considered adding a scoring factor called "Showoff" since this seems to be the main reason to buy this type of car? How would you re-rate them if you allocated 40 points in this factor?

—John Kern
Torrance, CA

Erroneously—Ed.

In your junior-supercars comparison test, you rate the Porsche 911's exterior design at 7. Go back to June 2015 with the Mercedes-AMG GT S comparison. You call the AMG devastatingly handsome, with crowd-stopping looks, yet you give it an 8 in styling and give the Porsche a 9. Not even including that, the GT is obviously the better car, but you just have to make the 911 win with some bogus agility thing. You even had a chance to fix the GT's handling by testing the Dynamic Plus package for $2600 instead of yellow paint for $9900. I'm not even going to go into the C63 comparison. I don't know what that was. Fix things when the AMG GT R comes out.

—Brian Jacob
Fairfax, VA

The 911 Turbo S has different styling than the 911 GTS has. And we compare cars within comparison tests, not across them—Ed.

As I listen to "Ventilator Blues," it is good to know that at least one other person knows that *Exile on Main St.* is the best album of all time. I've heard an Audi R8 blasting through downtown buildings. I heard it way before I saw it. It sounded like a car Thor would drive. But to compare the two, what a stroke of genius. Gotta run. "Sweet Virginia" is starting.

—Brog Goethe
Jacksonville, FL

You must be on shuffle, Goethe. "Sweet Virginia" comes after "Tumbling Dice"—Ed.

Racing your test cars on the tight rural roads of the Blue Ridge is beyond selfie-selfish; it is stupid and reckless beyond belief. Cancel my subscription.

—Jere Cunningham
Pinnacle, NC

SIM CITY

I doubt that any nerd playing a video game ["Simulated Fame," August 2016] will ever have the pleasure of keeping lap charts,

"IT SEEMS LIKE A GREAT CAR, AND THIS TIME IT IS BEAUTIFUL. I WISH ALFA WELL."

◄

swapping driving stints, rebuilding brakes between races—and a complete engine on the grass of the infield all night one notable weekend—and, incidentally, almost having a Boeing 767 land on top of your race team at Gimli Motorsports Park.

But I am not a Luddite. I have actually tried some of those driving simulators. The problem with them is that they still don't have the physics correct. The full-motion seats move forward when you brake and move back when you accelerate, which is correct, but the one I tried tilted right when you turned right and left when you turned left. This, of course, is the opposite of what you are trying to achieve. When you turn right, the g-force tends to throw you toward the left side of the cockpit and thus the seat should tilt left. But if you need to explain the physics, then I feel sad for the world.

—Dave Brown
Winnipeg, MB

It was great to see an article on my favorite hobby, "sim racing," in your magazine. I've been racing one thing or another since the Soap Box Derby in the 1950s (I had a motor on the thing a few weeks later). After a lifetime of racing everything I could get my hands on—or afford—I finally hung up my "real racing" spurs with a track championship in 1994 racing 100-cc karts and discovered the emerging world of sim racing. It has been amazing to see the sport evolve and grow over the years, and I have met so many friends who for one reason or another—usually money—no longer can park their butts in a real race car but, thanks to iRacing and its predecessors, can continue competing. I have a stable of hot cars: a Chevy C6.R Corvette, the new Corvette Daytona Prototype, a NASCAR Chevy Cup Car, an Xfinity Camaro, and a Super Late Model for the ovals. I am a member of one of the more competitive teams that runs in iRacing, have compiled a couple of championships, and, oh . . . I'm 70 years old.

—Gil Gauck
Keystone Heights, FL

I have been an avid sim racer since 2009, and it was great to see the mainstream press cover the sport. However, I wish you had mentioned alternatives to iRacing, which fastens itself to your wallet like a newborn calf to a cow's teat. Readers looking to try their luck on-track virtually should try out Race2Play.com, which uses commercially available software and doesn't nickel-and-dime you to death.

—Michael Herring
Denver, CO

Hey, Herring. No free commercials—Ed.

TURBO WHISTLE

What I'd really like to know is how you have come to do a 180 regarding turbos. Three decades ago, you sang paeans to the wondrous, inexpensive, fuel-saving gift of the turbo, which boosts power like a supercharger but has a bit of lag. Mostly true! Now that turbos are the Band-Aid to stave off "The Google," you guys piss and moan that the turbo "whine" detracts from the engine note! We all love great engine

When Porsche turbocharged the 911's flat-six engine for the 1976 911 Turbo Carrera, the 3.0-liter displacement of the naturally aspirated 911 went unchanged.

"MY GRANDFATHER WAS THE INVENTOR OF THE FOUNDATIONAL SIMPSON PLANETARY GEARSET AND LOVED TELLING ME ABOUT GEARS."

Explained: Turbos, then and now

Oreos are old hat? Wait, why did you put "old hat" and "The Google" in quotes? What the hell is "The Google"? I'll ignore all of that for now, but I will answer your coherent question. In the turbocharging scenarios of the '70s and '80s, engine displacement usually stayed the same. In those days, 200 horsepower was considered a lot, and any uptick in power, however small, was greeted with effusive praise because cars were pretty slow. Today, carmakers aren't choosing turbos for their ability to make more power—meeting Corporate Average Fuel Economy requirements is much more important. So, naturally aspirated engines are being replaced with smaller-displacement turbo engines that do well on the EPA fuel-economy cycles. In general, these downsized turbo engines provide strong low-end torque, but horsepower outputs are usually similar to the larger engines they replace, real-world fuel economy is about the same, and the turbo's lack of linear power delivery isn't much fun. As you mention, turbos affect the exhaust note, but that's a minor point—*Ed.*

sounds. The turbo is as much a part of that, as is the guttural whoosh of a supercharger! Either read history or grow up with it. Oreos are *truly* "old hat."

—O. Kleyton Cooper
Cleveland, OH

[See "Explained"]

GEAR WARS

I always enjoy *C/D*'s tech features, and "Four on the Floor," by Josh Jacquot, was no exception. I have a question on the operation of on-demand twin rear-axle couplings. Jacquot writes that the Ford Focus RS achieves a rear-wheel torque bias [when the coupling clutches are engaged] by using a rear final-drive ratio that is 2.7 percent "shorter" than the front axle's. The shorter rear gears try to turn the rear wheels faster than the fronts, thereby producing a torque-vectoring effect.

Wouldn't "shorter" gearing (numerically higher) in the rear ring and pinion try to turn the rear wheels slower than the fronts? Please enlighten this old hot rodder.

—Victor Lucariello
Archuleta County, CO

You're right, Lucariello. The description is correct, and the rear-axle gearing is taller than the front—Ed.

I enjoy your reviews and educational articles such as "Four on the Floor" about how AWD systems work. My grandfather was the inventor of the foundational Simpson planetary gearset and loved telling me about gears. If he were still alive, he would have loved your article, too. Keep informing us.

—John W. Simpson
Beverly Hills, MI

RADAR LOVE

The radar chart used to show competitors at the end of the Mazda CX-9 article ["Practical Magic," August 2016] makes me want to poke my eyes out.

—Niel Stender
Vevey, Switzerland

Any chance you drive an Equus?—Ed.

Why would I spend 45 large for a Mazda CX-9, 48 for a Honda Pilot, or 54 for a loaded Ford Explorer when I can have a Jaguar F-Pace for the same money? A 340-hp supercharged V-6, nicely equipped one at that. Pretty clear choice for me.

—Bruce Bastian
Denver, CO

Possibly because you need a third row—Ed.

I still prefer *C/D* to other car magazines, but please stop the ridiculous graphs that have been plaguing the magazine now for several years. The graph on page 068 of the August issue illustrates my point. It's unreadable page waste. If you open the mag to that page after reading this, it should be pretty obvious. Change is good . . . sometimes, but not with these.

—David Searle
Nanoose Bay, BC

It was refreshing to see the Mazda CX-9 in

your August issue. It's a vehicle that my friends or I might consider; something with a little sport, but with practical elements for those of us who drive in neighborhoods and not on the racetrack. For, as the article intro notes, "As much as we love driving them, sports cars can't accommodate [real life]." Can you get back to writing more articles like these? I've kept my subscription for 40 years to learn something about the spectrum of sporty-but-real-life vehicles that the manufacturers offer and their strengths and weaknesses. But I can't seem to get much of this information from *Car and Driver* anymore. You've dropped much of the real-car reporting and now saturate your issues with exotic-car minutiae ("Brembo brakes for the new BMW M series" or the latest expected horsepower engine upgrade for the Corvette [since two months ago]) and the 300th rerun of Chevy Camaro versus Ford Mustang. Your sister publication, *Road & Track*, to which I also subscribe, is mirroring this trend, seemingly reducing itself to a color commentary supplement to cars that *Car and Driver* wrote about the month before. But then you redeem yourselves with the Alfa Romeo Giulia—an article about a car and manufacturer newsworthy enough to be of interest to the rest of us. Oh, the angst; should I stay or should I go?

—Bill Di Capo
Rancho Cordova, CA

Even The Clash couldn't answer that question—Ed.

BAVARIAN CREAM

Your recent long-term test of the BMW M3 [August 2016] was of particular interest to me since I ordered and purchased one recently. A few thoughts:

It's very difficult to find a car with a manual transmission. I was only able to locate one in the entire state of North Carolina, and it had a sticker of $81K. Sorry, no. My car was a special order with a six-speed manual transmission, standard suspension, and 18-inch wheels. The only options were metallic paint and extended leather, resulting in a much more reasonable sticker of $66K. We have good roads in our part of the country (North Carolina mountains), so the ride is not a problem. It is firm but not uncomfortable. I could see it might be a little much in the Rust Belt with all the potholes and frost heaves. The acceleration is eye-opening. Just prepare yourself. A recommendation to anyone who special-orders a car in the eastern part of the country: Arrange for delivery at the BMW plant in Spartanburg, South Carolina. It is a great experience and well worth the inconvenience.

—Spence Peters
Fleetwood, NC

Regarding your long-term review of the M3, in which you reveal that ownership of what is essentially a race car is not everyday bliss on public roads. Congratulations, and welcome back to the real world inhabited by your readers! We've been patiently waiting.

I'd bet good money

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Letter of the Month:

John Pearley Huffman pointed out that the Rolls-Royce Dawn ["Dawn of the Bred," August 2016] has "some room in the trunk, there is a trunk, and it's easy to get in and out of."

Thank you for the thorough review, but I would request that future reviews of more moderately priced cars also include a description of how easy it is to get in and out of the trunk. Rich people aren't the only ones who like to sneak into drive-in movie theaters.

—Tom St. Louis
Morrison, CO

that most M3 owners regret not buying a 340i (or an Audi S4) in short order. It did not take me long to regret fitting a Mini Cooper S with the sport-suspension option. Three months was all it took for road heaves to jar me back to my senses at the same time that they compressed a fair number of my vertebrae.

—Gary Fackler
Newark, CA

FINE LINE

Your favorable comments layered on the 2017 Honda Ridgeline in the August issue ["'Line in the Sand"] is why my garage now harbors this new acquisition. I read one article, went to one dealer, and looked at one truck. I was not even interested in or prepared for this.

As a result, my cash reserves have been drastically reduced. I left thousands on the table with lackluster negotiating and my lousy trade-in vehicle. My self-esteem is suffering because I ignored self-developed cautionary manners and discarded all carefully crafted conservative fiscal notions. My defenses were breached without a shot being fired. What a dopey dupe I have become. Keep up the good work.

—Kerry Schumacher
Columbia, MO

I apologize for appreciating your Drivelines article about the new Ridgeline. I purchased one this week in spite of my Chevrolet dealer's warning that I will be driving a "girl" truck and that my scrotum will shrink. I'm actually one of those guys who really uses a pickup to haul stuff, and the Ridgeline will realistically handle all the stuff I do. Sure . . . if my wife buys me a 30-foot boat for Christmas, I will be screwed, but I'm willing to take the chance.

I understand that Ram drivers will not wave to me and I won't be able to buy one of those ball things for my trailer hitch, but I'll find a way to live with myself. I currently own a '96 "pre-inflated" Toyota Tacoma, and I've had a wonderful '96 Ford F-150, but I welcome the opportunity to have a truck that is reminiscent of a Chevy El Camino versus a school bus.

—Ray S.
Seattle, WA

Paging Dr. Freud. Dr. Freud to the Space Needle—Ed.

As a very satisfied owner of a first-generation Honda Ridgeline, I was nervous when it was announced that the Ridgeline would go on hiatus while being redesigned. When would it return? With dismal sales, would it ever return? Then the first artist's rendition was released. My nervousness turned to eagerness as I assessed the drawing. "I kind of miss the buttresses, but the body works. Is that a split tailgate? This could be good," a small voice inside my head told me. I should have known better. Of course the split tailgate wouldn't make it to production. To make matters worse, by teasing the ass and body in the artist's rendition, we were led to assume that the face would be just as pleasant. Instead, we have a brown bagger, a butter face! Honda's research suggests that just 6 percent of mid-size-truck buyers tow more than 5000 pounds. Did they do research into what percentage of mid-size-truck buyers want something with the face of a CR-V? The Chevy Colorado doesn't look like an Equinox, and the Tacoma doesn't look like a RAV4, and for good reason! I've got about 140,000 miles on my Ridgeline. Hopefully Honda gives this new model a facelift by the time I get to 200,000. If it doesn't, it may lose another sale to a Tacoma. At least then I could continue my effort to save the manuals!

—Greg Wetzel
North Aurora, IL

One thing's for sure: You will never find a pair of BuMpER NuTZ on a Honda Ridgeline.

—Dan Jakel
Grand Rapids, MI

Doc, tell me: What is it with the Honda Ridgeline?—Ed.

"IT IS VERY SATISFYING TO KNOW THAT AMG IS SUCH A BIG FAN OF THE FRONT-END STYLING OF MY 2012 MASERATI GRAN-TURISMO."

GREEN WITH ENVY

About the front-end looks of the Mercedes-AMG GT R in your reveal of the month ["Green Hell on Wheels," August 2016]: It is very satisfying to know that AMG is such a big fan of the front-end styling of my 2012 Maserati GranTurismo.

—Dave McKay
Palm Coast, FL

The AMG GT R looks like an erect penis wearing a green condom. This thing is pornographic. C'mon, Benz.

—Thomas J. Leih
Jonestown, TX

Leih, sometimes a GT R is just a GT R—Ed.

ACE OF BASE

I'm part of the 1 percent, and I'm not filthy rich ["Stripper Poll," August 2016]. The opposite, actually. See, I don't

have A/C in my new car. I bought a 2016 Nissan Micra here in Canada for $9988 (about $7700 U.S.). It's actually a pretty decent car except for the absence of aftermarket stuff because it's not sold in the United States. It pretty much has none of what is standard equipment on most vehicles these days.

Rear discs? Nope. A/C? *Nada*. Manual locks, manual transmission, manual windows, manual mirrors, and hubcaps? Yes, please!

The infotainment system consists of a radio and CD player with an auxiliary jack. I was thinking about what a terrible design the built-in bottle holder in the door is because the window crank hits the top of any bottle placed in it, then I realized that only 4 percent of Micras have roll-down windows.

The funny thing is, it's a blast to drive, mostly because you have to actually drive it, and there are no distractions in it. By the time you're in fourth gear, you haven't even passed the speed limit in town, and it is as cheap on gas as a 500-cc motorcycle.

Anyway, the sum of it is there is something to be said for simple.

—Sean Clancy
Vancouver, BC

Regarding your "Stripper Poll" piece in the August issue, my 2016 Hyundai Elantra L comes with no air conditioning. I asked for manual windows but was told they were only available on the Accent. I guess I am part of the 1 percent.

—Marvin Epstein
Westmount, QC

Look, guys, I've been to Windsor. I know all about Canadian strippers—Ed.

TRUE CRIME

What a disappointment John Phillips's August column turned out to be ["Intrigue in the email inbox of an automotive true-crime writer"]. I was just sure that a lead-in referring to duping 4000 buyers into buying nonexistent cars was going to end up being a story about Elon Musk and the Tesla Model 3.

—Alan Ploetz
The Suburbs, MN

DYER JOKES

When it comes to working in '90s alternative-music references, no one is better than Ezra.

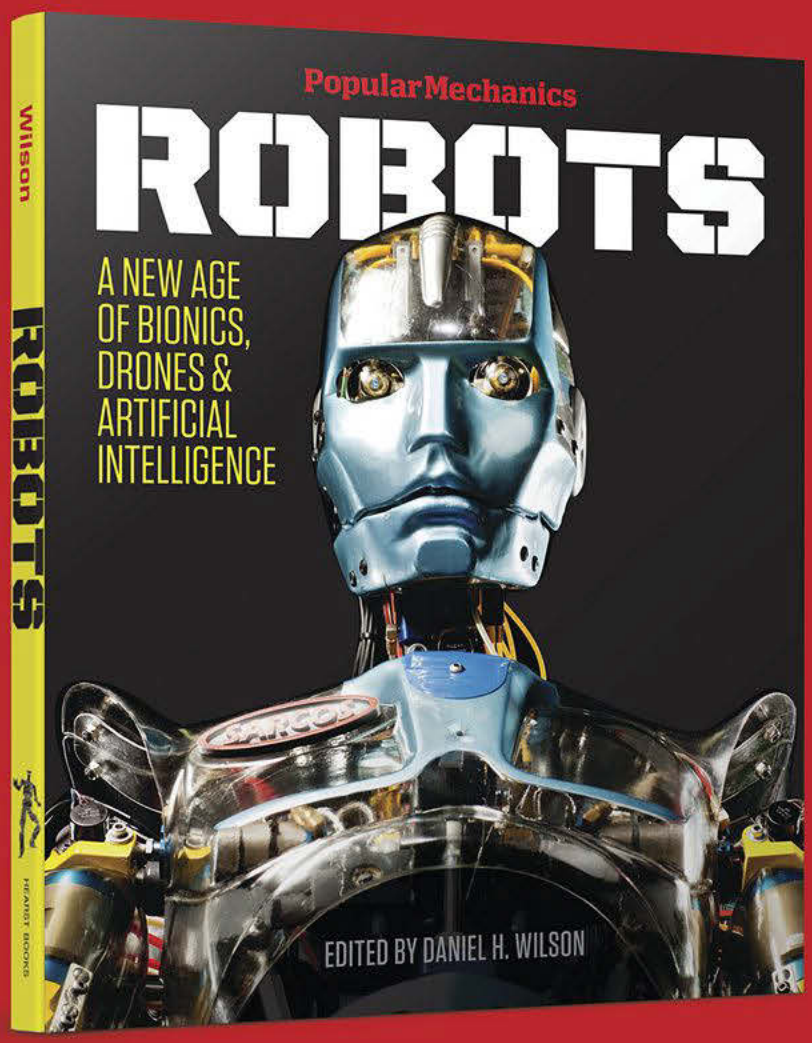
—Harvey Danger
Bedford, PA

THAT YOUR PURSE?

One of my biggest pet peeves with the automotive industry is this: There is no place for my purse. If I have a passenger, I place it on the back seat. More than three, I am forced to place it the trunk. With half the drivers being women, you would think that someone would have figured that one out. Seriously, someone figured out a space to place my gloves, why not my purse?

—Carolina Caird
Pacific Grove, CA

THE ROBOT REVOLUTION IS HERE.



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Reveal of the Month

BOURGEOIS RE-VOLT

MAYBACH'S ELECTRIC CONCEPT SAYS THE FUTURE WILL RESEMBLE THE PAST.
by Jeff Sabatini

DAIMLER'S SECOND ATTEMPT to relaunch Maybach has largely consisted of stuffing the back seats of Mercedes S-classes with pillows. Up to now, we'd say this effort deserves nothing more than a good hard rap on the knuckles from Grandpa's cane, except that those pillows are actually pretty comfy. But old money, by definition, wasn't born yesterday, and if Maybach is going to compete with the two other German über-luxury marques, the ones both pretending to be from Merrie Olde England, it's going to have to invent a compelling identity.

So here's the pitch: A high-tech autonomous EV that looks more than a little like the coachbuilt, art deco coupes of the '30s. Rolled onto the lawn at Pebble Beach this past August, the Vision Mercedes-Maybach 6, which we're going to just call the Vision 6, fit nicely with the Best of Show winner, a 1936 Lancia Astura cabriolet.

▼ DESIGN

We should have set a can of Coke—or perhaps a bottle of Dom—on the hood. Then you might better appreciate just how massive this automobile really is. Mercedes says the "6" in the name comes from its length, even though, at 5.7 meters (18.7 feet), the Vision 6 is still three decimeters short. As we're all prone to certain exaggerations, and as Maybach already had a model called

photography by JAMES LIPMAN

57, we can forgive a little rounding up. At 224.4 inches, the Vision 6 is exactly as long as a Chevy Suburban. It's wider, at 82.7 inches, but at 52.3 inches, it's about 1.5 inches taller than a Porsche 911. The wheels that hide behind body-colored aerodynamic shields are 24 inches in diameter and carry Mercedes tri-stars in their centers.

The Maybach grille stands thigh high, with chrome blades like a bread slicer's, ready to julienne pedestrians' legs. There's more chrome, of course, tracing the edge of the front splitter, along the rocker panels, and around the windows. A spear of metal emblazoned with the car's full name breaks up the vastness and rigorously pared-down surfacing of each body side while obscuring the gullwing doors.

Yes, it has this distinctive bit of Mercedes character, because the first word in Maybach is actually Mercedes. But no shiny bits do as much to proclaim the superiority of the driver as the twin chrome strips that extend from the front edge of the hood back almost to the taillights. With a curve only slightly greater than the horizon and nearly as long, these thin, taut character lines give Maybach's leviathan an energy missing from most land yachts.

When he describes the Maybach concept as "exaggerated," Mercedes design chief Gorden Wagener is not exaggerating. At least not until he says, "It's not so far out there."

▼ POWERTRAIN

Speaking of energy, the Vision 6 is an electric car. Why? Perhaps because Pebble Beach is in Tesla Country. Better to ask why, if it is electric, does it need a hood the size of a CEO's conference table? What's actually under there besides fitted luggage?

Since the Vision 6 is only a model, its power source could have been anything—solar, Soylent Green, a decommissioned Russian nuclear reactor. This makes the somewhat conservative choice rather underwhelming: A permanent-magnet AC motor is mounted at each corner to provide all-wheel drive and deliver a combined 738 horsepower. It's underwhelming, but also convenient. The SLS AMG Electric Drive used the same setup. Mercedes says that's sufficient for the Vision 6 to do zero to 62 mph in less than four seconds and hit a top speed governed at 155 mph. Range is

stated at more than 200 miles from its 80-kWh battery, which is packaged under the floor. Apparently nobody at Daimler heard that Tesla now offers a 100-kWh pack.

One other bit of reality amid this surreal and flamboyant assemblage of parts is that the Maybach uses the Combined Charging System (CCS) for fast DC charging. Daimler is one of the backers of this European standard offering an alternative to Tesla's proprietary Supercharger network. The Vision 6 is said to support a future version of the standard that would deliver 350 kW from a public charging station, rather than the 50 kW most CCS chargers deliver now. (Tesla's network currently can deliver up to 135 kW.) Mercedes says this would enable adding 62 miles of range to the battery in just five minutes.

▼ INTERIOR

The inside of the Maybach is exactly the sort of digital playscape you might expect from a car with a future-focused powertrain. Information dances around the windshield in a widescreen head-up display that we hope only works when the car is in autonomous mode. The actual instrument panel on the dashboard is a wraparound strip of touch-sensitive glass, which extends to encompass the door-mounted seat controls before spilling into the bulkhead behind the seats. Mercedes' interior designers envisioned the car as either a two-seater or a 2+2. The rendering [see right] depicts the former.

INFORMATION DANCES AROUND THE WINDSHIELD IN A WIDESCREEN HEAD-UP DISPLAY THAT WE HOPE ONLY WORKS WHEN THE CAR IS IN AUTONOMOUS MODE.

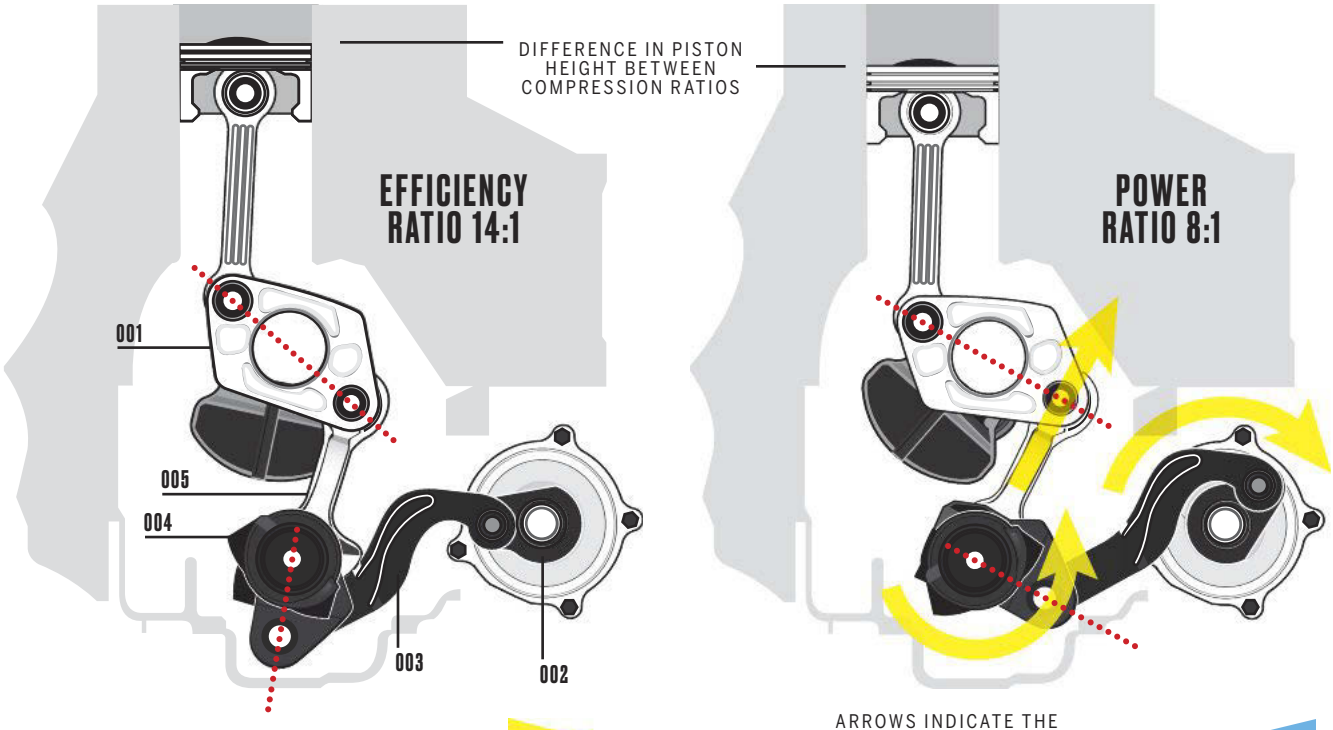
▼

Between the seats is a transparent center tunnel in which a light show "visualizes" the vehicle's energy flow. Upholstery buttons include "body sensor displays" to monitor vital functions and feed data to the climate and seat-massage controls. Yet within this cocoon of fantasy tech, the Vision 6 retains a pair of analog gauges above its two-spoke steering wheel, which is wrapped in leather. Much of the rest of the interior is leather as well, including the dashtop and the door panels, which flow into the curved buckets of the seats. A wood floor made of elm replaces the usual Maybach deep shag but reinforces conventional luxury motifs from the pre-digital era. You know, back when old luxury was born.

SHIFTING THE SQUISH

INFINITI TAKES RECENT HISTORY'S BIGGEST STEP IN ENGINE DESIGN. ***by Don Sherman***

FOR AGES, AUTOMAKERS have been searching for a practical means of varying an engine's compression ratio on the fly. How hard the air—and sometimes the fuel—is squeezed before ignition plays a crucial role in overall efficiency: Compressing the mixture as much as possible without detonation yields a longer expansion ratio and more power for every increment of fuel consumed. Since the compression ratio is determined by basic engine geometry (the cylinder volume with the piston at the bottom of its travel versus the top), that isn't easily changed. One expedient now in wide use is combining the Atkinson cycle with variable valve timing. But Infiniti has made a significant stride with its Variable Compression-Turbo (VC-T). This boosted 2.0-liter four-cylinder, the product of two decades of research and 300 patents, will power unspecified Infiniti models beginning in 2018. Here's how it works:



ARROWS INDICATE THE MOTION THAT SWITCHES FROM THE EFFICIENCY RATIO TO THE POWER RATIO.

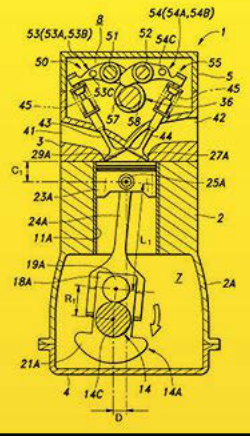
The key enabler is a piece Infiniti calls the "multi-link," (001) a diamond-shaped component that replaces the connecting rod's big end and allows computer control over each cylinder's compression ratio.

When the electronically controlled harmonic drive mechanism (002) rotates, the actuator arm (003), eccentric control shaft (004), lower link (005), and, finally, the multi-link all move to vary the piston's stroke.

Infiniti claims VC-T is capable of providing any desired compression ratio between 8:1 and 14:1. Bumping the ratio to 14:1 during light-throttle cruising maximizes fuel efficiency. Then, when the driver dips into the throttle, the compression ratio can drop as turbo boost rises, avoiding detonation. Infiniti hasn't yet revealed any power, torque, or mileage ratings but claims that VC-T will combine the power of a 2.0-liter turbo gasoline engine with the torque and efficiency of a similarly sized diesel. Many automakers have experimented with compound-connecting-rod and moving-cylinder mechanisms, but Infiniti appears to be the first to solve the durability issues of a crankcase stuffed with links and levers.

STROKER ACE

Honda has filed a patent in Japan for an engine in which each cylinder has a different stroke, their altering displacements translating to varied power potential and fuel consumption. The goal is to take fuller advantage of cylinder deactivation. When, for the purposes of saving fuel, the engine-control computer deactivates cylinders, it will be able to pick and choose which cylinders to drop to best match power and efficiency with the demands placed on the engine. If it moves beyond the developmental phase, it will still be years out. But probably not the 20 years Infiniti has into its VC-T. ***–Jared Gall***

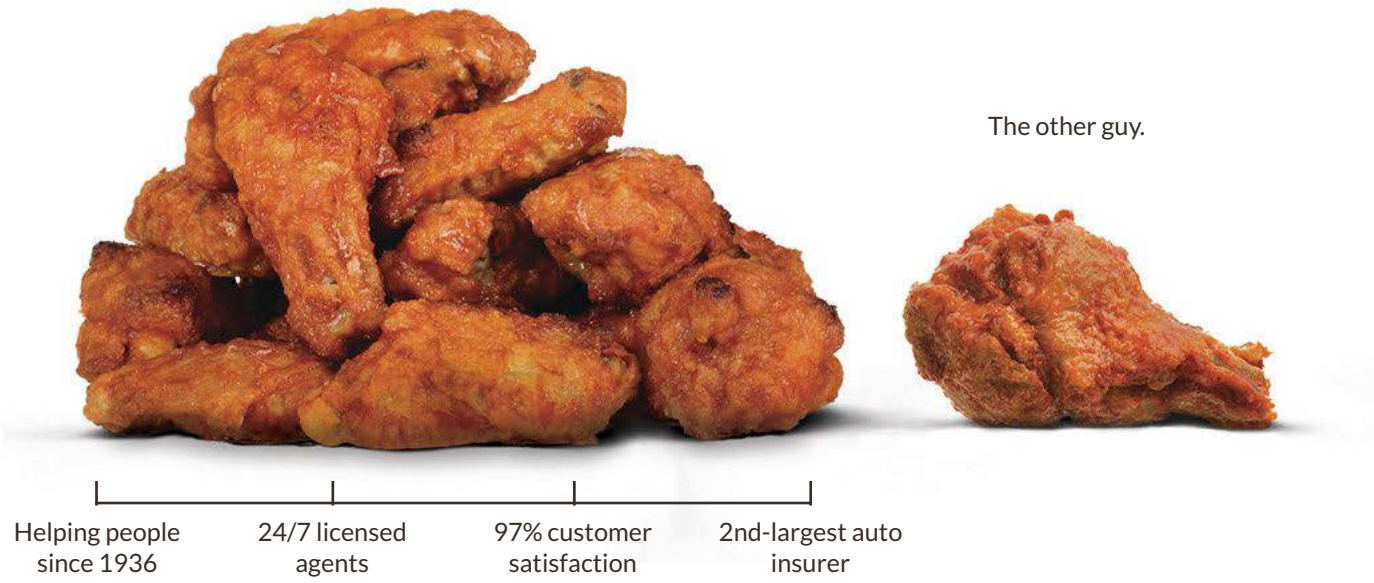


ATKINSON EXPLAINED

In the Atkinson cycle, the intake valve remains open during a portion of the compression stroke. The piston forces some of the charge back into the intake manifold, reducing the effective compression ratio. The efficiency gain comes from an unaltered (full length) expansion ratio.

illustrations by PETE SUCHESKI

GEICO



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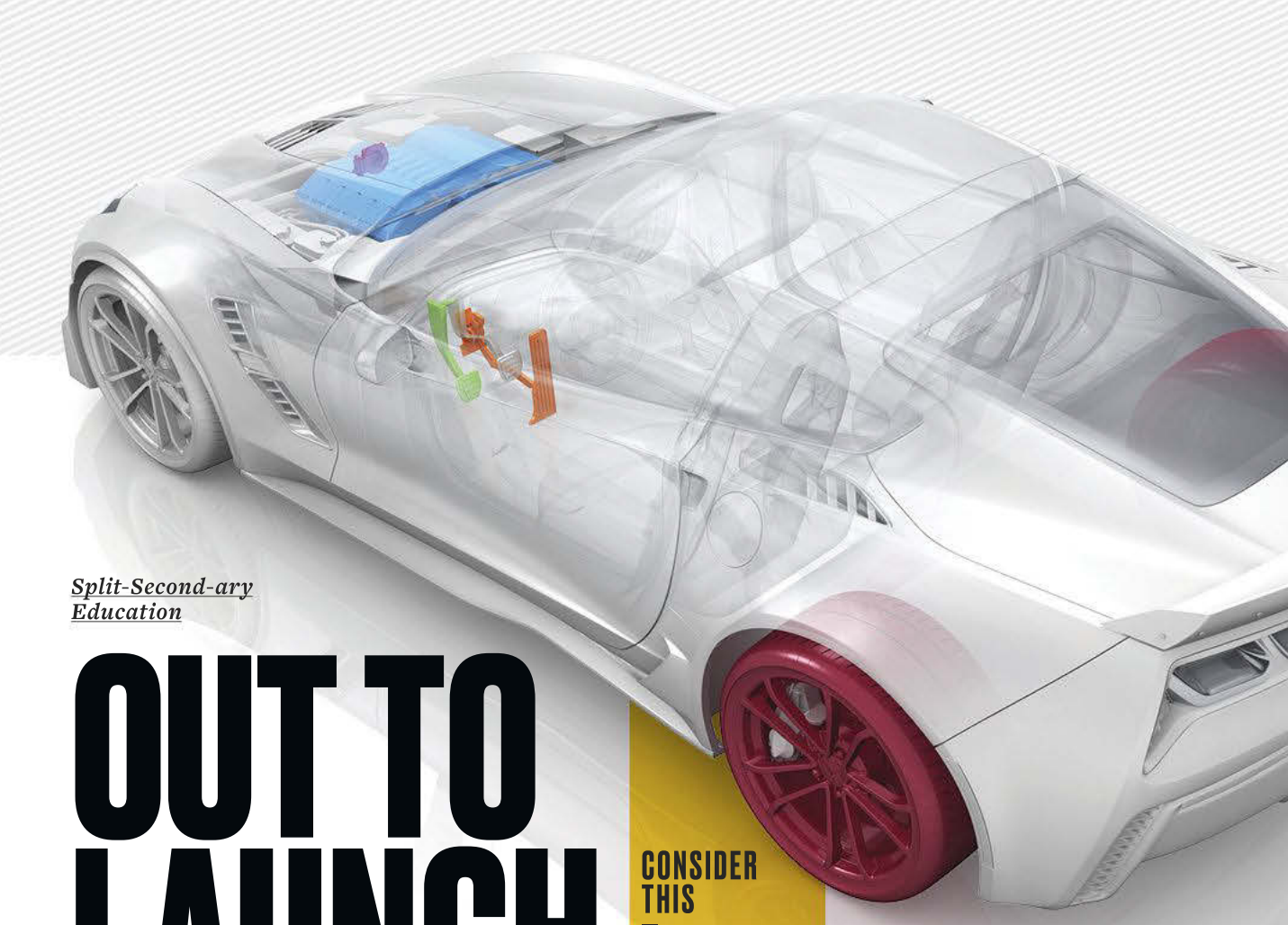


Split-Second-ary Education

OUT TO LAUNCH

A LOOK AT THE ART (AND THE DATA) BEHIND LEAVING THE LINE RAPIDLY.
by Josh Jacquot

WE LIKE WOODING IT. And since you're reading this magazine, we bet you do, too. But despite the appeal of such heavy-hammer techniques, they're rarely the fast way off the line. When it comes to launching a modern sports car, carefully metered restraint is the hot ticket.

But what really goes on in those split seconds when the car begins moving? What's happening at the tires when you finally commit fully to the throttle and release the clutch? How much wheelspin is the perfect amount? And what's the difference between a human-actuated launch and one handled by launch control? We took Chevy's Corvette Grand Sport to the track to find these answers and more. Some are spelled out in the ultra-high resolution recorded by our Racelogic VBOX data logger [see right], which, in addition to acceleration, tracked 13 channels of data directly from the Corvette's ECUs.

The Grand Sport, optionally equipped with ultrasticky Michelin Pilot Sport Cup 2 tires, puts down 465 pound-feet of engine torque through more than 26 inches of rubber at its drive wheels. It's one of the easiest cars to launch with consistency, and its standard launch control is deadly effective at handling the job on its own. See for yourself:

CONSIDER THIS

We've shown before that a determined driver with enough practice can beat a well-calibrated launch-control system ["Smokeless Burnout Acid Test," June 2011], but it's getting harder. And it won't happen the first time a rookie drops the clutch. As recently as five years ago that might have been the case, but today's systems, and the Chevy's in particular, are rapidly closing the gap. We generated the best driver-controlled numbers without launch control on our sixth attempt.

SPEED (MPH)	LAUNCH CONTROL (SEC)	DRIVER CONTROL (SEC)
10	**0.64**	0.67
20	**1.25**	1.35
30	**1.90**	1.91
40	2.57	**2.53**
50	3.30	**3.27**
60	4.31	**4.26**
70	5.27	**5.22**
80	6.65	**6.59**
90	8.00	**7.95**

001. ENGINE SPEED vs. VEHICLE SPEED

GM uses intake air temperature as the sole criterion to determine the engine speed for launch control before the clutch is released. We use experience and luck. During the launch-control run, engine speed plummets from 4050 rpm to 2550 in 0.17 second and then begins a rapid oscillation that climbs slowly as vehicle speed increases. GM uses transient-optimized ignition-timing control, meaning it adjusts spark timing with millisecond precision to deliver torque that is appropriate for the available grip. The difference between front- and rear-wheel speeds is the primary factor used to determine the ignition timing and throttle-plate position during this period. The bigger the speed difference, the more power is cut. Relying primarily on spark control to make this reduction allows torque to be revived as soon as the very next cylinder event, which is much quicker than waiting for the intake manifold to refill, as would be necessary if torque were modulated only by closing and reopening the throttle plate. And our right foot isn't as precise or as quick as the computer's. Engine speed rises and falls as much as 570 rpm in the 1.4 seconds after the clutch release begins in our freestyle run.

illustration by BRYAN CHRISTIE DESIGN

Note that all acceleration data used in this story lacks the standard weather correction, rollout adjustment, and two-direction averaging we normally apply to zero-to-60-mph and quarter-mile times. Accordingly, these numbers can't be compared with other C/D tests of the LT1-powered Corvette.

002. ACCELERATOR-PEDAL POSITION vs. CLUTCH-PEDAL POSITION vs. VEHICLE SPEED

Removing our foot from the clutch pedal in the launch-control run yielded a fully released pedal in 0.2 second. Though our release rate was slower than GM's ideal 0.1-second rate, it was still well within the threshold of the calibration. A damper in the clutch's hydraulic line slows clutch engagement in a "side-step" type release. In our best-effort launch, we metered the clutch engagement carefully to modulate wheelspin. In that run, the clutch release, which begins at the friction point of about 75 percent, consumes 1.2 seconds. Launch control is definitely easier on the clutch. Finally, notice that the launch-control run yields a higher speed early in the run and carries a 1.0- to 1.5-mph advantage for about half a second. Our best-effort launch doesn't pay off with higher speed until 33 mph, a few mph before the tires stop spinning.

003. ACCELERATOR-PEDAL POSITION vs. THROTTLE-PLATE POSITION

Activating launch control requires the accelerator to be flat on the floor. It stays there for the entire run, since the Grand Sport has no-lift shift logic. With launch control, the throttle plate opens from 25 percent to 100 percent over 1.6 seconds as the car begins to move. Our best launch shows the same modulation of the accelerator pedal seen in the second graph while the electronically controlled throttle plate exaggerates our efforts, opening and closing more than our foot requests.

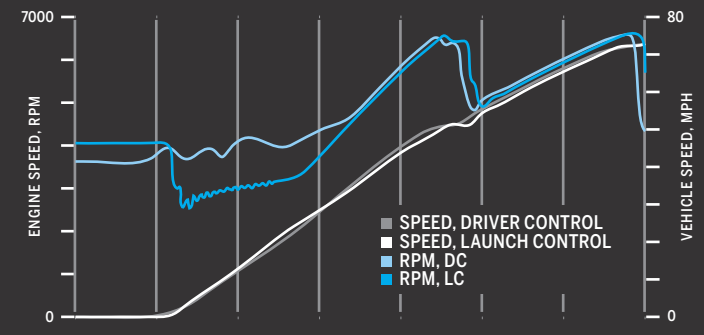
004. REAR-WHEEL SPEED vs. VEHICLE SPEED

GM's launch-control calibrators face two primary challenges: driver-induced differences in clutch-release time and the 0.2 or so second required to fill the intake manifold with air. The system is calibrated to manage those factors and produce a robust launch on a range of surfaces by controlling wheelspin with ignition timing and fuel delivery. Notice that the launch-control run produces immediate wheelspin and that the difference between rear-wheel speed and vehicle speed peaks at almost 18 mph before the two taper back together. Our launch, however, shows no wheelspin until 5 mph, then, when wheelspin begins, the difference between wheel speed and vehicle speed peaks at a very similar 19 mph. Our launch yields a higher peak longitudinal acceleration, which lasts longer than the launch-control run.

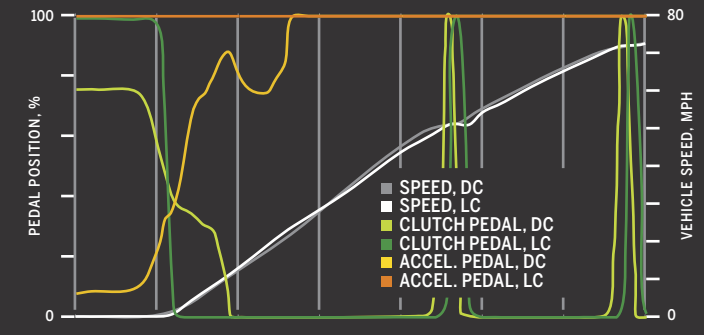
005. LONGITUDINAL ACCELERATION vs. VEHICLE SPEED

Accelerating longer and at a higher rate are the keys to being quicker. By spending three times as long (0.45 second versus 0.14) accelerating at a rate higher than 0.80 g, our best launch gains its small advantage. It's in the middle of that period that our run surpasses the speed of the launch-control run, too. A higher peak acceleration of 0.87 g versus 0.83 g helps.

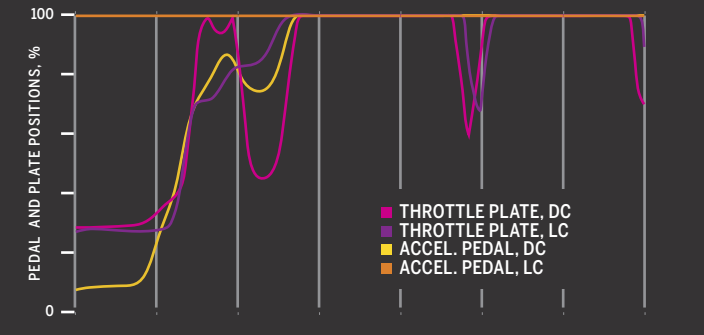
001. ENGINE SPEED vs. VEHICLE SPEED ▼



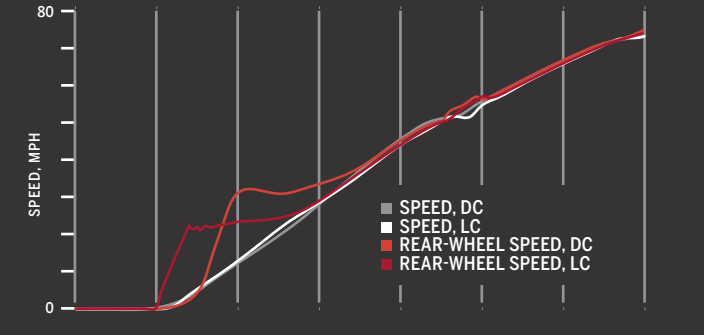
002. ACCELERATOR PEDAL vs. CLUTCH PEDAL vs. VEHICLE SPEED ▼



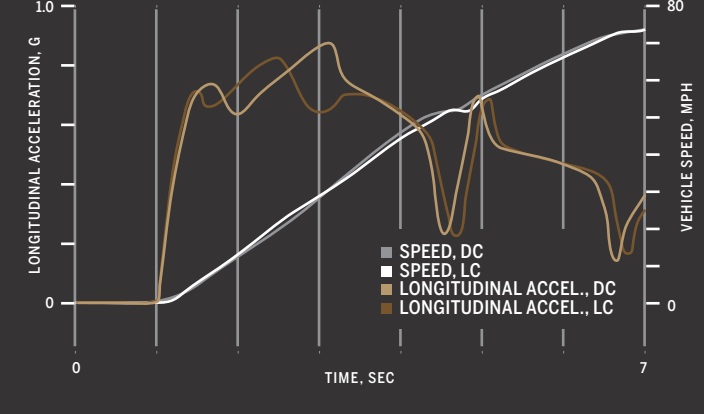
003. ACCELERATOR PEDAL vs. THROTTLE PLATE ▼



004. REAR-WHEEL SPEED vs. VEHICLE SPEED ▼



005. LONGITUDINAL ACCELERATION vs. VEHICLE SPEED ▼



DOUBLE INDEMNITY

EVEN THE EXPERIENCE OF INSURING AN OLD CAR IS UNIQUE. *by John Pearley Huffman*

LINCOLN'S LINCOLN

Big-ticket cars—from the mid-six-figure range on up—are practically impossible to total. As long as the vehicle's identification plate can be salvaged, the car can be rebuilt around it. Specialty insurers are used to dealing with such claims and accommodating repairs that may require expertise unavailable at the local Maaco. They also may be more understanding when an owner makes a total-loss claim but wants to retain the wreckage.

INSURANCE IS THE ROOT canal of automotive enthusiasm. It's fine print, inscrutable terms, disaster scenarios, and just-tell-me-where-to-send-the-damned-check resignation. It gets more obscure when insuring collectible cars.

"An auto policy is an auto policy," explains Jonathan Klinger, public-relations manager for Hagerty Insurance. "The difference between a regular auto policy and a collector policy is how it treats the value of the vehicle." For most of the 260 million or so cars on America's roads, that value is set according to relatively straightforward depreciation schedules.

But about 18 million to 20 million cars in the United States (Hagerty's guess; the company says it insures about 1.2 million of them) qualify generally as custom, collectible, antique, or classic cars. They're normally not used every day, they're driven few miles every year, and their true value usually has nothing to do with depreciation. Classic-car insurance policies are typically based on an "agreed value" assessment of a car's worth. For restored or preserved classics, that's usually based on sales and auction results. Most of the time, Klinger says, an appraisal isn't necessary. But one can be used in determining a specialty vehicle's value or in resolving a disagreement. Hot rods, for example, tend to reflect the initial builder's taste and personality, which doesn't always translate into widespread desire in the market. Those cases may involve more negotiations on value based on the effort and money sunk into the car.

Limited-use insurance for collectible cars is available from specialists such as Hagerty and Grundy, as well as national players like State Farm. There's no specific mileage limitation in most cases, but piling on 15,000 commuter miles in a year might result in some policy changes. And if you get into a fender bender at Home Depot while your Ferrari 275 GTB/4 is overloaded with lumber and house paint, your insurer may suspect that you're not treating the car like a cherished icon.

Many common collector-car claims originate in the garage. Specialty insurers are used to dealing with cases such as carburetor fires, plummeting boxes, or a car that falls off its jack stands. But the big advantage of collector-car insurance is cost. According to Klinger, collector policies only generate around one-tenth the number of claims of standard insurance. Fewer claims usually translate into lower prices. Tammy Dobrotin, a State Farm agent in collector-rich Santa Barbara, California, explains that while many individual variables go into calculating premiums, a $20,000 collectible in her area may be insured for as little as $90 every six months. A regular-use policy on a similarly valuable daily driver may run four to five times that. So, while your agent will always be happy to tell you where to send the damned check, at least the check will be a little smaller.

THE LARGEST POPULATIONS OF COLLECTOR-CAR OWNERS ARE IN THESE FIVE STATES:
1. CALIFORNIA
2. MICHIGAN
3. NEW YORK
4. FLORIDA
5. TEXAS

THESE ARE THE 10 MOST COMMON COLLECTOR MODELS:
1. CHEVROLET CORVETTE
2. FORD MUSTANG
3. CHEVROLET CAMARO
4. CHEVROLET BEL AIR
5. FORD MODEL A
6. FORD THUNDERBIRD
7. VOLKSWAGEN BEETLE
8. CHEVROLET C10 PICKUP
9. CHEVROLET IMPALA
10. CHEVROLET CHEVELLE

LIST DATA SOURCE: HAGERTY INSURANCE

illustration by TAVIS COBURN

DARE TO ASK, WHERE NEXT?
INTRODUCING THE FIRST-EVER XT5.

WHATEVER YOU SEEK, THE STYLISH XT5 CROSSOVER HAS A SPACIOUS INTERIOR THAT ADAPTS TO ACCOMMODATE YOUR NEEDS. **CADILLAC.COM/XT5**

Cadillac

DARE GREATLY

Preproduction model shown.
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Perhaps you've heard of Hans Monderman. I hadn't until recently. With a name like that, I imagined he was a cheese Danish or the guy who invented the spin cycle on Maytag washers. Instead, Monderman (1945–2008) was

a traffic engineer in the Netherlands, where he offered to help speed the flow of traffic—as much as 22,000 cars daily through some intersections—in a town in Holland called Drachten. In response, Monderman apparently dialed his brain to its own spin cycle, because he ripped down every single traffic signal in the city.

Not only did he dismantle the signals, he also binned the speed-limit signs, no-parking signs, curbs, speed bumps, warning signs, railings, and directional lines painted on the asphalt. What he wanted were wide-open intersections—so-called "shared spaces"—and he wanted them to be a little intimidating, a little ambiguous. Drivers had to ask, "What, exactly, am I supposed to do here?"

Monderman's idea was that motorists would take cues from observing other motorists. He wanted them to make eye contact and negotiate rights of way among themselves. His assumption was that when people feel insecure, they're more attentive, patient, and alert—a voluntary behavioral change. It sounds like a recipe for *Lusitania*-quality catastrophe, with random *C/D* editors using the clear intersections as skidpads. (We would.) Instead, the intersections promoted a more efficient flow of cars, buses spent less time waiting, startup times were slashed, and accidents both declined and were less severe.

"Who has the right of way?" Monderman rhetorically asked. "*I don't care*. People here have to find their own way, negotiate for themselves, use their brains."

Imagine an NFL game where the yardage markers, end zones, and goal posts have all been removed. "Did he kick the ball through the uprights? Well, in my mind he did. High-five."

See what I mean about disaster? Of course, relying on traffic engineers to keep us safe is your basic slopery slip slicked twice. For instance, consider what most of us do when facing a yellow light: We speed up, often dramatically, to tear through the intersection like torched weasels. Think about that. You speed *up* so that you barely miss the onslaught of cars that will momentarily be thundering toward your side doors? That's not rational. But the reason we do it is that the stoplight somehow confers the illusion of safety, gives us the confidence that we have the right of way, tells us that someone else has "cured" the intersection of danger.

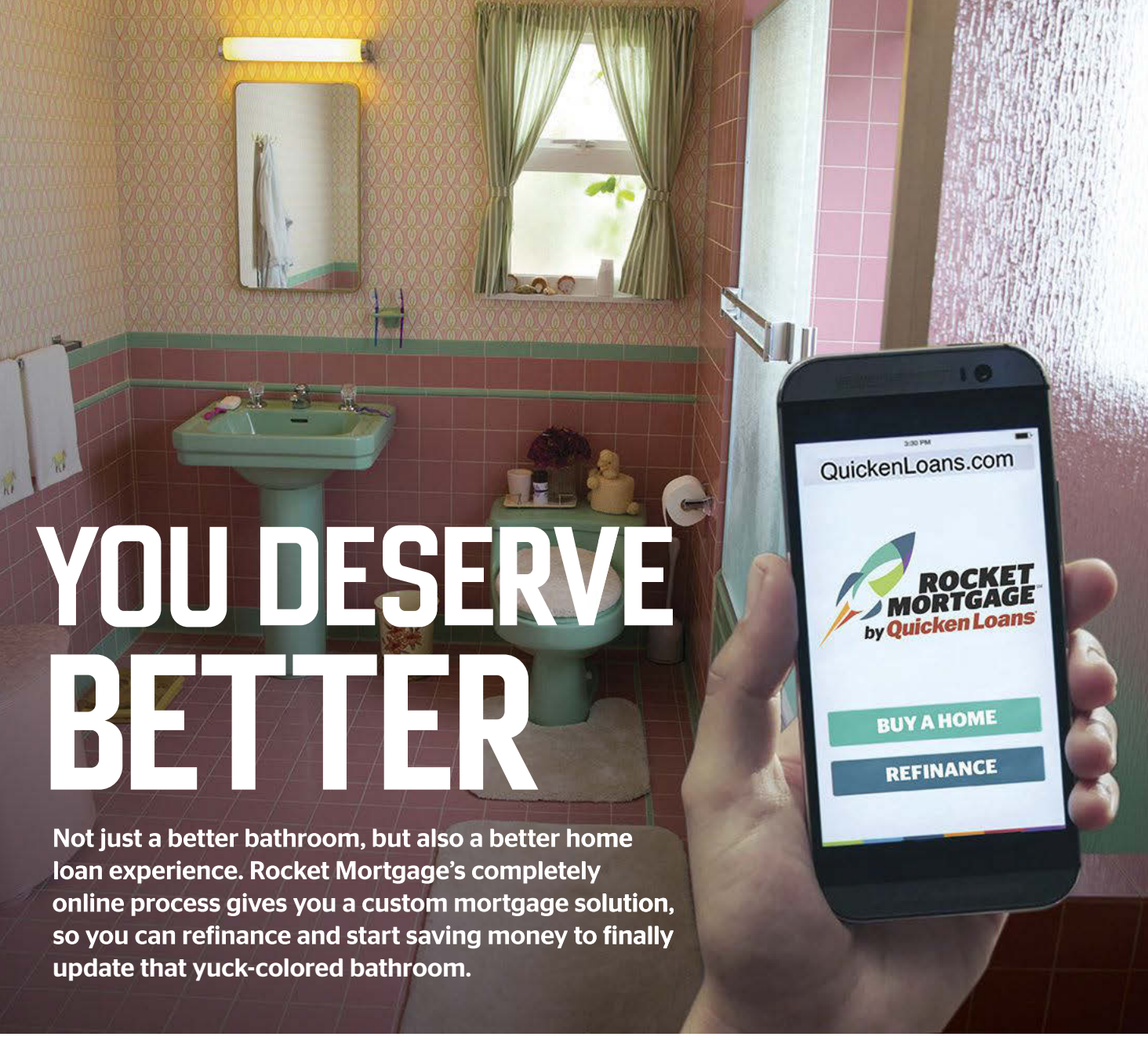
"A wide road with a lot of signs is telling a story," Monderman asserted. "It's saying, 'Go ahead, don't worry, go as fast as you want, there's no need to pay attention to your surroundings.'" Which means you're trusting a government official with your life. What if that official is oh, say, Rod Blagojevich? Of course, the scheme isn't without pimples. For starters, shared-space intersections stop being efficient when drivers average more than about 20 mph. I assume that's because the time to make decisions becomes too slim. What's more, elderly pedestrians and bicyclists sometimes loathe shared spaces, understandable if marked crosswalks exist only in your imagination. Sometimes, aggressive drivers realize they can take greater risks than unprotected bike riders and pedestrians, so a kind of "law of the jungle" emerges.

Conversely, shared space can also flummox timid drivers, who come to a complete stop and begin knitting sweaters to calm down. Unfortunately, travel speeds are dictated by the slowest driver. If you'd like to see timid drivers in action—well, in *in*action—come to Ann Arbor. They'll be waiting for you. Other distracted drivers—say, bowling-team captains with itchy skin conditions—can become so confounded by the sign-free intersections that they conclude it's a good place to park. Heck, nothing said *not* to, right? Of course, a car blocking shared space eliminates the "shared" half of the equation and is too much like occupying Wall Street. Speaking of New York City, it probably won't work there, either, because the highlight of every New Yorker's day is a rancid dose of road rage via staged head-on collisions. Not that I'm bitter about NYC or anything.

So, should Monderman be planet Earth's traffic guru? Beats me. The guy drove a green Saab, so, well, there's that. And in one town where he removed all the signs, he erected another that said "Free of Traffic Signs," which reminds me of Terry Bradshaw's press conference to announce he wasn't stupid. Still, there's evidence that shared space works in certain locales—recently, West Palm Beach and Savannah.

If you could peer into Monderman's brain, you might see that great 20th-century philosopher, Theodor Seuss Geisel, saying: "If you can see things out of whack, then you can see how things can be in whack." In whack is good, but it means making things up as you go along, which also explains my career. Still, wouldn't it be cool if, indeed, unsafe is safe?

John Phillips



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Tom Hurley from Dallas has a 171-mph 1957 Chevy nicknamed "Old Stewball" that has a 632 big-block making 1150 horsepower. The week before the annual Bonneville Speed Week this past August, his crew evaporated.

One got in a motorcycle wreck; another bailed to stay home with an ailing wife. Well, thought Hurley, what the hell, and he loaded the car anyway, driving solo and nonstop the 1300 miles to the salt flats near Wendover, Utah. I, too, was at home thinking, well, what the hell, so I hitched a ride with friends from *Hot Rod* magazine to that ancient salt playa where so many greats have trod. Upon arriving, we found tacked to a board Hurley's handwritten sign asking for volunteers. I called the number and learned that if you want to work at Bonneville, you have to act fast. Hurley already had a guy from Fort Worth, a guy from the Yukon Territory, and folks from England, France, and New Zealand pitching in. Because that's Bonneville.

Speed Week is 68 years old, but the past two years have been washouts due to monsoonal summer rains that turned the five-foot-thick salt pan into unusable oatmeal. Every year, the salt rats wait out spring and summer with fingers crossed, hoping that the salt will be dry enough to race on by mid-August. Cancellation can happen at any moment, even the day before the event if Mother Nature is feeling particularly cruel. At the drivers' meeting this year, I met Brenda Bowen, a University of Utah geology professor who has been studying the sodium-chloride playa and the altering effects of climate change and mining.

The 10,000-year-old salt flats are all about water, she said. In winter, they want lots of it in the form of briny groundwater below and smoothing rainwater above, then several months of hot, dry weather to bake the surface into a hard crust resembling white asphalt.

In recent years, the rains have come at the wrong time, and the groundwater has gone elsewhere, harvested by a commercial mining operation to the south. But the Southern California Timing Association has been working with the miners and various government agencies to hammer out a plan for the future. I expected to find an American racing institution on the verge of extinction but departed optimistic that the efforts to save it are real, if still entirely at the mercy of the changing weather.

Meanwhile, the salt rats were overjoyed to be racing again, even if the crust was only a few millimeters thick in places. Danny Thompson, son of the late Indy 500 and drag-racing impresario Mickey Thompson, was trying to tie up a loose end dating to 1968. Back then, the elder Thompson was foiled by weather in setting a record with the twin-engine Challenger 2. The 400-mph car went into storage for the past four decades, during which Mickey Thompson was murdered in a case that went unsolved for 19 years. Danny eventually decided to drain all his worldly assets to rebuild Challenger 2, dumping in $2 million plus a smattering of private contributions, including a donated tow rig. And Danny did it on day two, setting a class record at 406.769 mph and writing the Thompson name permanently into the 400-mph club, which now swells to just 15 members.

Troy Trepanier, of Rad Rides by Troy, walked us through his new coffee-colored streamliner for the Mariani brothers, two California almond farmers and avid salt-flatters. The artistic perfectionism that has raised the cost of winning national hot-rod shows into the mid-six figures is now influencing Bonneville, the 900-hp Mariani streamliner being an exquisitely clean machine packed within a skeleton of beautifully fish-mouthed tubing.

We bumped into drag-racing royalty, Don "the Snake" Prudhomme, walking the starting line. He told me, "It used to be a big deal to get into *Car and Driver*," and I hope it still is. As the Snake examined a black lakester with jutting pipes, the crew chief leaned into the cockpit and whispered to the guy who was about to go more than 250 mph, "Don Prudhomme is checking you out!" The driver seemed pleased.

Down in the pits of Speed Demon, the fastest car this year at 436.959 mph, famed engine magician Kenny Duttweiler showed us the computer traces from the last run, including a perfectly square tabletop created by 68-year-old owner George Poteet mashing the accelerator at the line and not lifting until the chutes. "We just have to build the traction control around George's driving style," Duttweiler said.

Later, I rode with Duttweiler in the push truck. At around 40 mph, two loud bangs from the pipes of Speed Demon's twin-turbo 368-cube small-block indicated that Poteet was on it. The golden, finned syringe simply jetted off and disappeared. Still accelerating at over 400 mph, however, the engine let go. Blown head gasket. Duttweiler was philosophical. "It's got five runs on it," he said, meaning the circa-$50,000 V-8 had lived a long, useful life of roughly eight minutes. Because that's Bonneville.

Aaron Robinson

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The first note was polite. "Hello, I drive a Nissan Leaf. My car for some reason only charges on the left kiosk. If and when convenient, could you help a fellow EV driver by using the charger by the street? Beautiful car, by the way!"

The beautiful car in question was a Tesla Model X P90D in which I'd logged 249 miles en route to Charleston, South Carolina, to check out Mercedes' groundbreaking ceremony for its new, enormous van factory. And while I was off watching Senator Lindsey Graham tie himself in rhetorical knots—his speech praised NAFTA and free trade, yet the reason we were all there was because of the 25-percent vig on imported trucks—the Tesla sat at a municipal charger in a parking garage, replenishing its battery for the trip home. And, unbeknownst to me, severely aggravating a certain Leaf driver.

Our EV-charging infrastructure has come a long way since the first Chevy Volts and Leafs hit the street about six years ago. Back then, you had to get creative. When I registered at a hotel in Los Angeles circa 2010, I asked the guy at the desk if there was anywhere I could plug in a Leaf. "If I gave you a room on the ground level, could you plug it in to an outlet in your room?" he asked. In fact, I could. Since the Leaf logs its charge locations, someone from Nissan later got in touch to ask where I'd discovered a heretofore unknown public charger. "Room 104 at the Ramada," I replied.

A couple years past the debut of the Volt and Leaf, it seemed as if there were plenty of chargers and barely any cars to use them. Now it's often the other way around. During last year's 10Best testing, I drove a Model S 70 back to my hotel, planning to plug in overnight. But when I arrived at the chargers, they were socked in with Leafs, with a Volt lingering nearby and making everyone uncomfortable.

While inconvenienced, I was not exactly outraged, because public-charging etiquette dictates that the Leaf and other limited-range pure electrics have top priority. Teslas come next, since they have larger battery packs and can use Supercharger stations, which are off-limits to the plebes. Lowest on the list are the plug-in hybrids, since they can use a popular network of high-speed chargers called "gas stations."

I predict that we're nigh upon the hour when plug-in hybrids get banned from public chargers, since they incite such rage among EV drivers. I once pulled up to a garage in Los Angeles in a Volkswagen e-Golf and found the lone charger occupied by a Volt, prompting me to start wailing, "Why me?" like Nancy Kerrigan.

Conversely, when I parked the Model X at my town's lone public charger, I returned to the car just at the moment that the owner of an adjacent Ford Fusion Energi walked up. "Busted!" he declared, before apologetically adding, "You need it more than I do." I agreed that I did. Only in the strange world of electric vehicles can you feel morally superior while popping open the power gullwing doors on your 463-hp SUV.

This cooperation among EV owners, this fragile truce, depends upon conscientious use of the public charging infrastructure. And I admit that in Charleston I violated a major rule: When you're charged, you move. And that's why there were not one, but two notes on the windshield.

The second note read: "Unbelievable how inconsiderate you are being to the electric-car community here in Charleston. You have been hogging this charger for at least a day and a half. Charleston doesn't have the infrastructure for asses like you to be so selfish. It takes three to four hours to fully charge. Then move to another spot!!!"

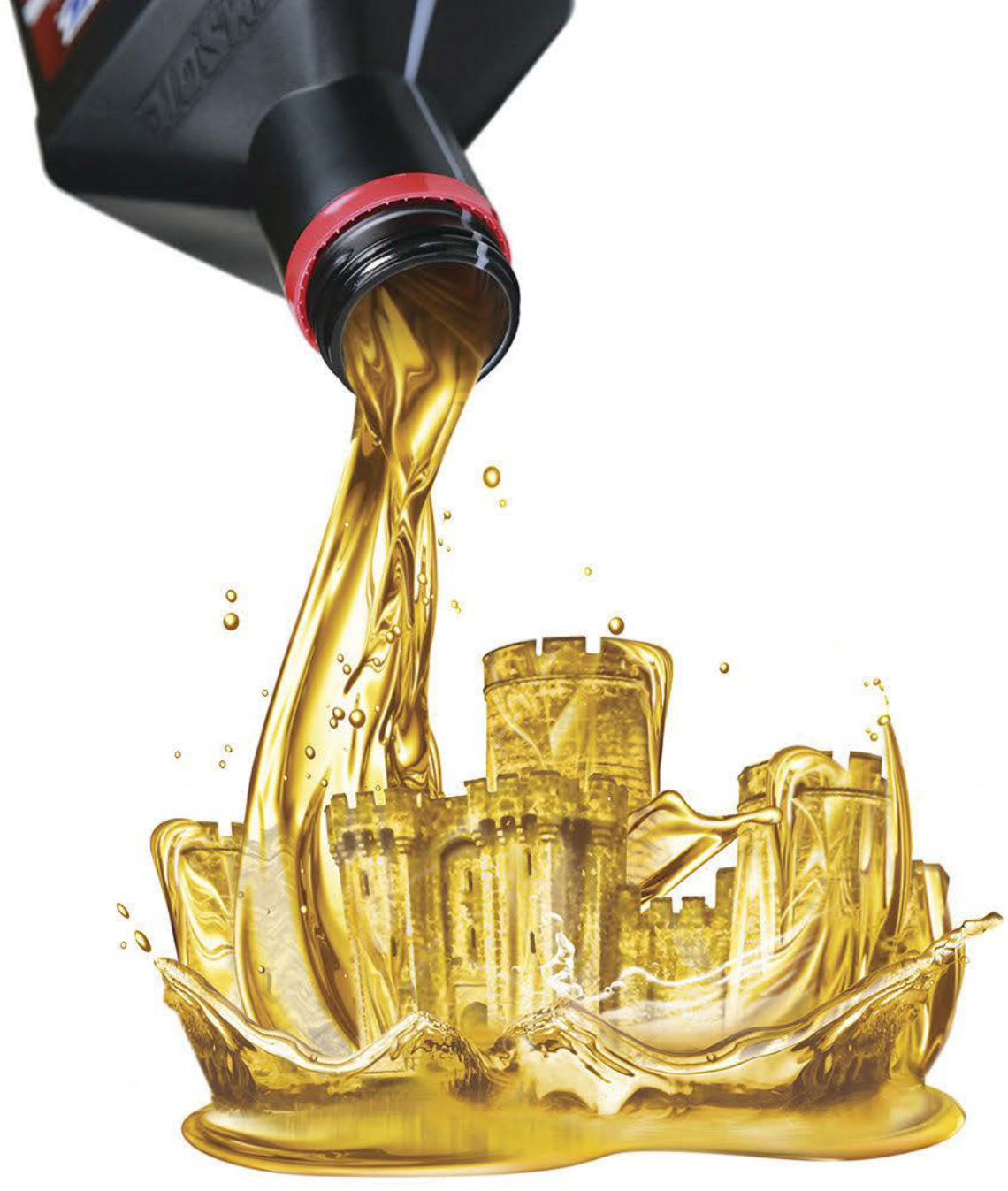
I admit that I got a little bit indignant when I read this one. First of all, Leaf Guy, this charger was dribbling out 12 miles of range per hour, which means I needed 20 hours anyway. And it is not my fault that your car has a problem with the perfectly good charger in the space next to this one. Furthermore, I'm detecting an element of proprietorship here. This is a public garage. If you want a charger that's always available, get a charger.

And, finally, three exclamation points? I would've felt your rage more keenly if you'd written everything in capital letters and dotted the i's with boogers, but that's just the editor in me talking.

Still, I feel guilty. Because I know that, despite my adversary's incorrect assumptions, I did linger too long. I recounted this story to the local Tesla service manager and wished aloud there were a way another driver could unlock the Tesla's charge port when the battery's full. "The adapter locks to the car, but you can unplug a public charger from that at any time," he said. "That guy should've done that. Problem solved."

Now I didn't feel so bad. Here was Leaf Erikson, exploring uncharted waters of note-scrawling aggression, when all he had to do was unplug the charger. So let's normalize that practice, EV owners: If the battery's full, give that cable a pull. And save the nasty notes for the Volts.

Ezra Dyer



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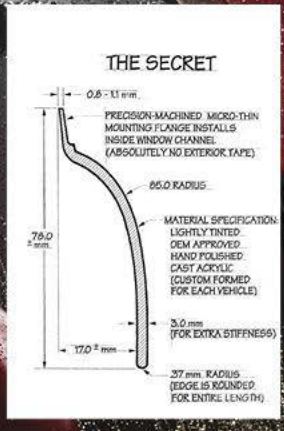

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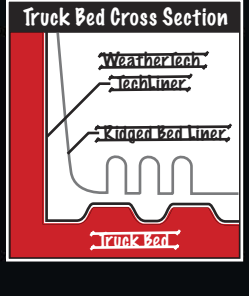

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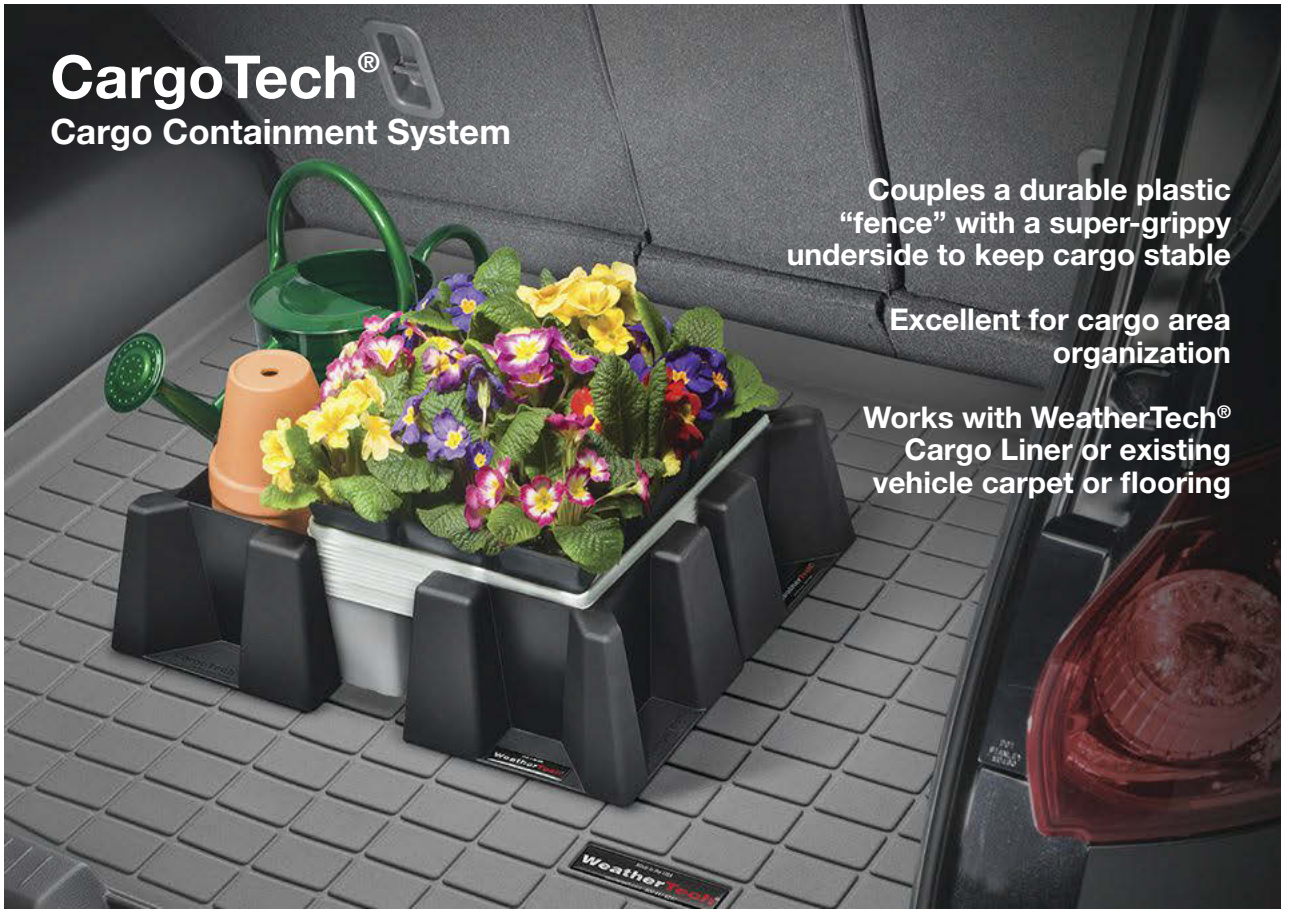

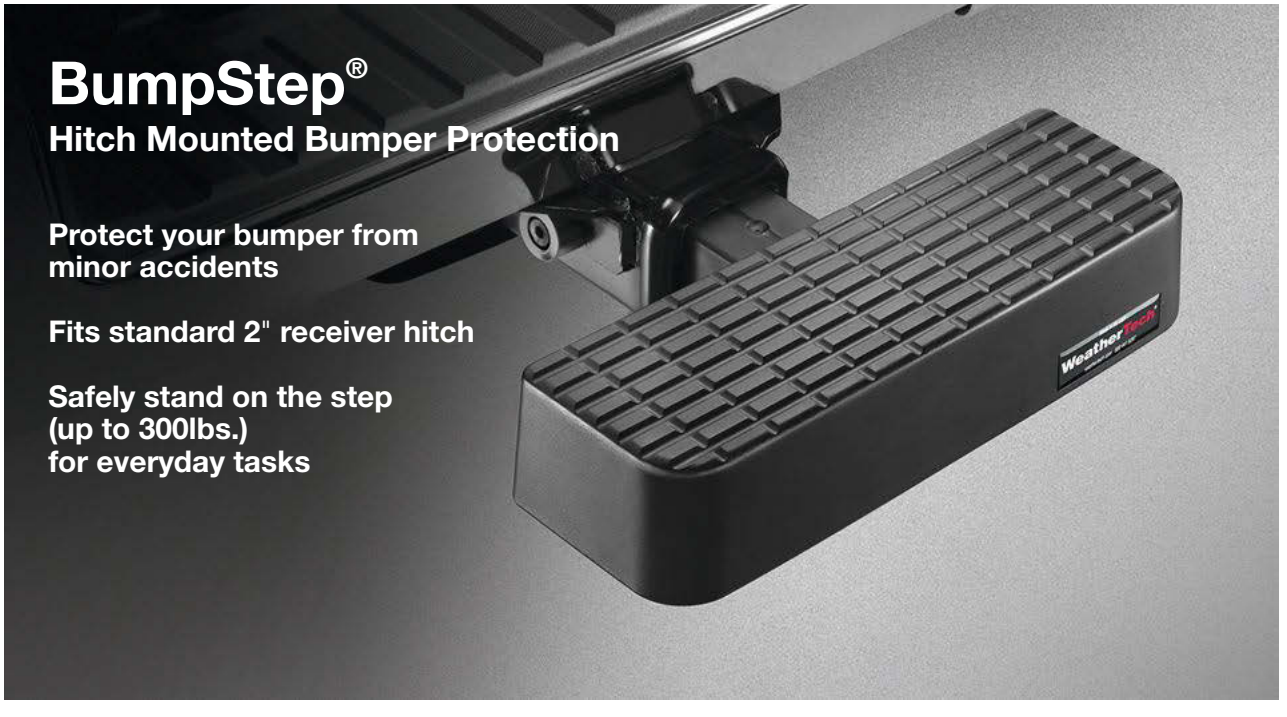

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SUVs You Won't Hate

If it seems to you as if crossovers and SUVs are taking over the world, it's because they are. The humpback hatchbacks make up

35 PERCENT OF THE NEW-VEHICLE MARKET

in the U.S., and that number is growing fast. Their choke hold on sedans grows tighter each year. But do not give up the enthusiast faith, brothers and sisters. The relentless expansion of SUV varieties and makers means that there are high-performance utes to counter the ponderous ones. There are genuinely luxurious options, not just bedazzled work trucks. We have gathered, over the next 23 pages, a collection of SUVs from across the price, performance, and practicality spectrums that will not invalidate your auto-enthusiast cards. We've also included a few of our personal steeds, some old crocks, and a few more worthy of recognition.

LIGHTS IN THE

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

DARKNESS

Jaguar and Porsche prove that an elevated center of gravity and a mainstream mission need not preclude a serious sense of fun.

_by Jared Gall

_photography by Greg Pajo

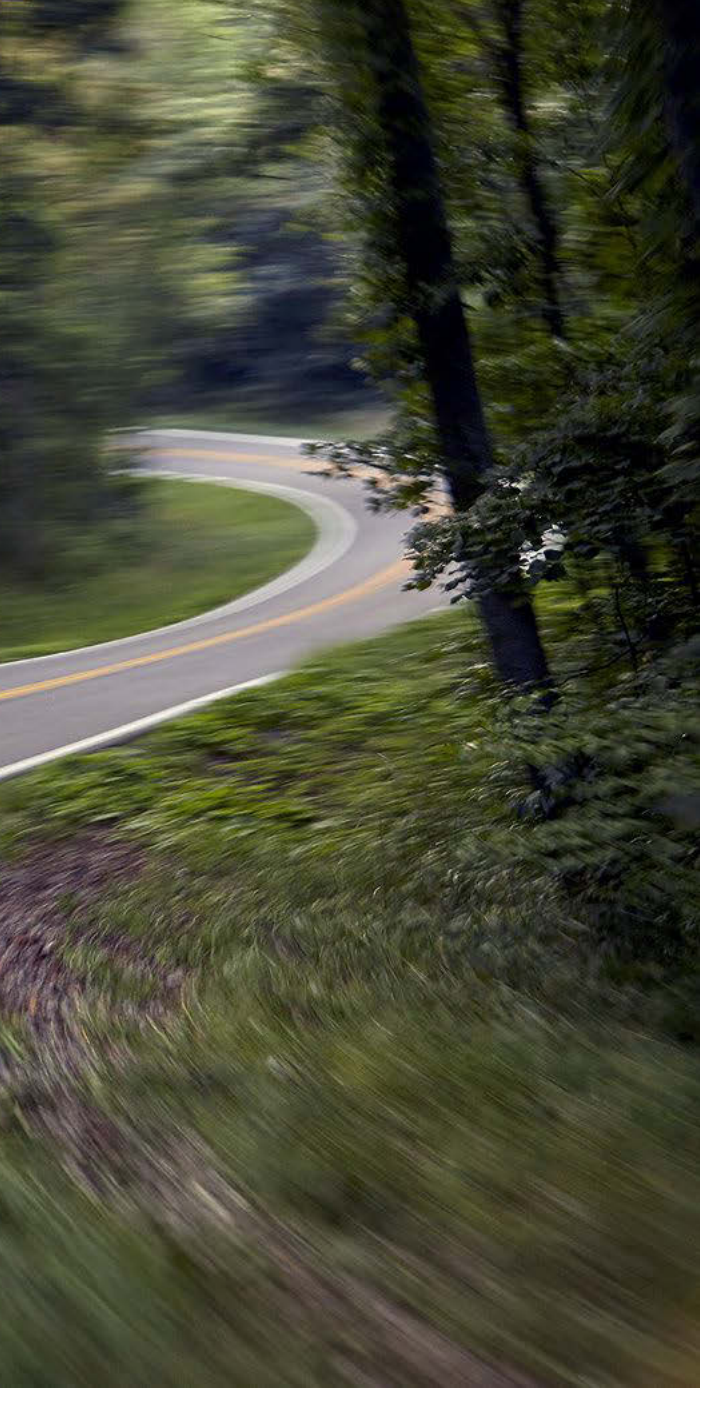
SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

IN AN INDUSTRY that lives and dies by the sales of Camrys and pickup trucks, advocating for enthusiasts sometimes feels like standing in a raging river and shouting at it to reverse course. Manual transmissions are slipping toward oblivion. Fuel-economy regulations are driving diversity from manufacturers' engine portfolios, replacing it with efficient homogeneity. And perhaps most worrying is the proliferation of crossovers. They're like an algal bloom threatening to choke out all other life-forms in the interest of easy ingress and a commanding driver's position.

But a few shafts of light have started to pierce the heavy blanket of crossover conformity. Porsche's first glimmer of hope, the Cayenne, dates to before most people realized the market potential of a high-performance crossover. In its first year on the market, the Cayenne became Porsche's best-selling model. The creators of the Pink Pig learned lessons from their new 5000-pound supersow, and the smaller, Audi Q5–based Macan has already dethroned the Cayenne as the brand's sales leader. The example tested here is the new-for-2017 GTS, which splits the difference between the $55,450, 340-hp S model and the $77,050, 400-horse Turbo.

Revised ECU tuning boosts the Macan GTS's output over the S's to 360 horsepower and 369 pound-feet, while standard adjustable air springs lower ride height by 0.4 inch. Like other Macans, the GTS is only available as an all-wheel-driver with a seven-speed PDK dual-clutch transmission. This example's $68,250 base price swelled to an as-tested sticker of $77,255. Notable extras include the Premium Package Plus ($3390; panoramic sunroof, heated seats front and rear, keyless entry and starting, and auto-dimming mirrors), brake-based torque vectoring ($1490), the



Sport Chrono package ($1290; dash-mounted stopwatch, launch control, and sport-plus mode for harder-edged suspension and drivetrain responses), and a key painted to match the car (cost to you: $525; cost to Porsche: maybe a buck). Any color other than simple black or white also costs extra, and our Volcano Grey Metallic lists for $690. The Carmine Red on our cover Macan? $3120.

Jaguar's beacon of hope is new for 2017. Never mind that Land Rover functions as the SUV arm of jointly owned Jaguar Land Rover; to get Americans to pay attention, every brand needs its own crossover. Jaguar plows a lot of aluminum into the F-Pace, using the lightweight stuff for most of the body structure and suspension components. A diesel four-cylinder is the base engine, but the likely volume engines are a pair of aluminum V-6s shared with the F-type.

Displacing 3.0 liters and pumped full of 13.8 pounds of boost by an honest-to-John-Force Roots-type supercharger, Jag's V-6 posts a 20-hp advantage over the Porsche's, peaking at 380 in the S trim tested here. ZF's ubiquitous eight-speed automatic sends torque to

	2017 JAGUAR F-PACE S FIRST EDITION	2017 PORSCHE MACAN GTS
PRICE AS TESTED	**$71,095**	**$77,255**
BASE PRICE	$70,695	**$68,250**
DIMENSIONS		
LENGTH	186.3 in	184.7 in
WIDTH	76.2 in	76.1 in
HEIGHT	65.0 in	63.6 in
WHEELBASE	113.1 in	110.5 in
FRONT TRACK	64.6 in	65.0 in
REAR TRACK	65.1 in	65.3 in
INTERIOR VOLUME	**F:** 51 cu ft **R: 45 cu ft**	**F: 52 cu ft R:** 44 cu ft
CARGO BEHIND	**F: 64 cu ft R: 34 cu ft**	**F:** 53 cu ft **R:** 18 cu ft
TOWING		
MAX	**5290 lb**	4409 lb
POWERTRAIN		
ENGINE	supercharged DOHC 24-valve V-6 183 cu in (2995 cc)	twin-turbocharged DOHC 24-valve V-6 183 cu in (2997 cc)
POWER HP @ RPM	**380** @ 6500	360 @ 6000
TORQUE LB-FT @ RPM	332 @ 4500	**369** @ 1650
REDLINE/FUEL CUTOFF	6800/6800 rpm	6800/7000 rpm
LB PER HP	**11.8**	12.5
DRIVELINE		
TRANSMISSION	8-speed automatic	7-speed dual-clutch automatic
DRIVEN WHEELS	all	all
GEAR RATIO:1/ MPH PER 1000 RPM/ MAX MPH	❶ 4.71/5.0/34 ❷ 3.14/7.6/51 ❸ 2.11/11.4/77 ❹ 1.67/14.4/98 ❺ 1.29/18.6/126 ❻ 1.00/24.0/155 ❼ 0.84/28.6/145 ❽ 0.68/35.9/135	❶ 3.69/5.0/35 ❷ 2.15/8.7/61 ❸ 1.41/13.3/93 ❹ 1.03/18.0/126 ❺ 0.79/24.4/159 ❻ 0.63/31.2/150 ❼ 0.52/37.6/140
AXLE RATIO:1	3.73	2.94
CHASSIS		
SUSPENSION	**F:** control arms, coil springs, anti-roll bar **R:** multilink, coil springs, anti-roll bar	**F:** multilink, air springs, anti-roll bar **R:** multilink, air springs, anti-roll bar
BRAKES	**F:** 13.8-inch vented disc **R:** 12.8-inch vented disc	**F:** 14.2-inch vented disc **R:** 13.0-inch vented disc
STABILITY CONTROL	partially defeatable, traction off	fully defeatable, competition mode, launch control
TIRES	Pirelli P Zero 265/40R-22 106Y	Michelin Latitude Sport 3 **F:** 265/45R-20 104Y **R:** 295/40R-20 106Y

CAR AND DRIVER TEST RESULTS

ACCELERATION		
0–30 MPH	2.0 sec	**1.4 sec**
0–60 MPH	5.3 sec	**4.4 sec**
0–100 MPH	13.2 sec	**11.7 sec**
0–130 MPH	27.3 sec	**22.7 sec**
1/4-MILE @ MPH	13.9 sec @ 102	**13.0 sec @ 105**
ROLLING START,		
5–60 MPH	5.7 sec	**5.4 sec**
TOP GEAR, 30–50 MPH	3.3 sec	**3.1 sec**
TOP GEAR, 50–70 MPH	4.3 sec	**3.9 sec**
TOP SPEED	155 mph (mfr's claim)	**159 mph** (mfr's claim)
CHASSIS		
BRAKING, 70–0 MPH	160 ft	**157 ft**
ROADHOLDING,		
300-FT-DIA SKIDPAD	**0.88 g**	**0.88 g**
610-FT SLALOM	40.6 mph*	**41.1 mph**
WEIGHT		
CURB	4501 lb	**4492 lb**
%FRONT/%REAR	51.0/49.0	56.2/43.8
CG HEIGHT	26.5 in	**24.0 in**
FUEL		
TANK	16.6 gal	**19.8 gal**
RATING	91 octane	93 octane
EPA COMBINED/CITY/HWY	**20/18/23 mpg**	19/17/**23 mpg**
***C/D* 600-MILE TRIP**	**16 mpg**	15 mpg
PRACTICAL STOWAGE		
NO. OF 9 X 14 X 22-IN BOXES, SEATS UP/FOLDED	**7/20**	6/16
LENGTH OF PIPE	**125.5 in**	124.5 in
LARGEST FLAT PANEL, LENGTH X WIDTH	**70.0** x 40.3 in	66.5 x **40.5 in**
SOUND LEVEL		
IDLE	**40 dBA**	46 dBA
FULL THROTTLE	81 dBA	**78 dBA**
70-MPH CRUISE	**69 dBA**	**69 dBA**

**Stability-control inhibited.*

tested by ERIC TINGWALL *in Chelsea, MI*

all four wheels, as it does in every F-Pace that Jaguar plans to bring to the U.S. Our example is one of 275 First Edition F-Paces, loaded up with 22-inch Pirelli P Zeros, an 825-watt Meridian stereo pounding through 17 speakers, Jaguar's new InControl Touch Pro 10.2-inch infotainment interface, and more. Total retail price: $71,095.

Aired up and topped off, we charted a course for Caldwell, Ohio, tucked into the state's southeast corner near the Ohio River and the West Virginia state line. Here, where the roads swell and pitch across the Allegheny Plateau, we began to see the F-Pace and Macan as more than just a pair of new vehicles. Maybe crossovers like these, squatting lower, with roof- and beltlines creeping back toward the ground, portend a gradual shift away from wannabe off-roaders and back toward the lower-center-of-gravity car architectures on which the crossover boom was born. Or maybe they're just flukes. Even if that is the case, they're delightful flukes.

It might be late to the luxury-brand-SUV party, but the F-Pace is a fine presentation of Jaguar character in a sensibly sized and attractive package.

2. JAGUAR F-PACE

A little larger than the Macan and a lot sexier, the F-Pace blends the requisite crossover stance and Jaguar's corporate face with rear haunches and taillights reminiscent of the company's F-type roadster. It's a modern and more artful interpretation of the backwoods Corvette-on-a-Blazer-frame mash-ups that you see on YouTube, and it's a stunner, particularly in profile and from the rear.

The F-Pace also stuns from behind the wheel, a congruent follow-up to the excellent F-type and XE. Its variable-ratio steering rack is hypersensitive, snapping to attention immediately off-center and piping feedback up to the driver's palms. And the chassis commanded by that steering boasts a neutrality rare in the crossover realm, rotating off throttle before a poke of the accelerator tucks everything back in line. The all-wheel-drive system sends torque exclusively rearward until it senses a need for it at the front end. In extreme conditions, it can divert up to half the engine's output forward.

But those 22-inch wheels that look so good, and the Pirellis that grip so well, can often overpower the dampers, transmitting impacts into the cabin that the Macan is able to filter out. The tires also tram-line on uneven freeway surfaces while the Porsche tracks true. And even in dynamic mode, which firms up the adaptive dampers, the F-Pace moves around more on its springs. While both stick to the skidpad at 0.88 g, the Porsche pulls through the

Jaguar F-Pace [+] Achingly beautiful profile and rear views, the steering that the Porsche wishes it had. [–] Busy body motions, less-polished interior. [=] No matter how deep the field, it would finish near the top.

slalom a *skosh* faster on account of its superior body control. And while their 70-to-0-mph braking performances are nearly identical—160 feet for the Jaguar and 157 for the Porsche—the F-Pace's pedal travel starts with a moment of worrisome squish. It's progressive once the driver pushes through, but the imprecise initial reaction saps confidence.

Jaguar did, however, nail the packaging basics on its first crossover. It seems likely that notes were passed between the Jaguar and Land Rover R&D teams. Occupants sit upright, with excellent lines of sight and plenty of room front and rear. It might look as if it belongs in a different size class, but the F-Pace isn't actually much larger than the Macan at all, measuring just 1.6 inches longer and 1.4 taller, with 2.6 inches more wheelbase. But as soon as anyone needs to climb into the back seat, the F-Pace again seems one size up, with real space in back for adults—even three of them, in a pinch—while time in the back of the Macan rates as punishment for everybody. And no mere pretty face, the F-Pace is rated to tow 5290 pounds while the Macan is cleared to tug 4409.

It's spacious, but the Jag's interior lacks the fastidious detailing and cohesive sense of quality that the Porsche's exhibits. The latter's materials feel richer and the design

FINAL RESULTS

Shell V-Power NiTRO+ Premium Gasoline
The Official Fuel of CAR AND DRIVER

	Maximum points available	2017 PORSCHE MACAN GTS	2017 JAGUAR F-PACE S
RANK		**1**	**2**
VEHICLE			
DRIVER COMFORT	10	**9**	**9**
ERGONOMICS	10	**9**	8
REAR-SEAT COMFORT	5	3	**5**
REAR-SEAT SPACE*	5	**5**	**5**
CARGO SPACE*	5	2	**5**
TOWING CAPACITY*	5	4	**5**
FEATURES/AMENITIES*	10	6	**10**
FIT AND FINISH	10	**10**	8
INTERIOR STYLING	10	**10**	8
EXTERIOR STYLING	10	8	**10**
REBATES/EXTRAS*	5	0	**1**
AS-TESTED PRICE*	20	18	**20**
SUBTOTAL	105	84	**94**
POWERTRAIN			
1/4-MILE ACCELERATION*	20	**20**	16
FLEXIBILITY*	5	3	**4**
FUEL ECONOMY*	10	9	**10**
ENGINE NVH	10	**10**	8
TRANSMISSION	10	**10**	8
SUBTOTAL	55	**52**	46
CHASSIS			
PERFORMANCE*	20	**20**	**20**
STEERING FEEL	10	8	**9**
BRAKE FEEL	10	**9**	7
HANDLING	10	**10**	8
RIDE	10	**10**	8
SUBTOTAL	60	**57**	52
EXPERIENCE			
FUN TO DRIVE	25	**22**	**22**
TOTAL	245	**215**	214

These objective scores are calculated from the vehicle's dimensions, capacities, rebates and extras, and/or test results.

better realized. Jaguar's InControl Touch Pro touchscreen infotainment system organizes vehicle functions in a far neater manner than Porsche's button explosion, but while it is quicker than the brand's last-generation system, there's still a fair bit of lag between screen poke and response. And a back button that sometimes takes you back one menu and sometimes pitches you all the way to the home screen is one sure way to raise the driver's pulse.

Those drivers who do probe its limits will find the F-Pace an appealing blend of engagement and practicality. And those who need to regularly transport more than two adults will appreciate its more spacious second row. But for drivers seeking enlightenment in a crossover, Porsche's light burns just a little bit brighter.

1. PORSCHE MACAN GTS

Initially, this felt a little bit like throwing the Jaguar to the wolves—or, given the English translation of the Indonesian word *macan*, to the tigers. Catfight, indeed. Is the regular F-Pace, even a fully trimmed one, a fair match for the tightly focused Macan GTS? Well, they line up on price, and most of the stuff that makes a Macan a GTS is available on other Macans as well. A lightly spec'd Turbo or a loaded S would keep the prices close but even further tilt the scales in performance and features. If you're looking for a crossover that doesn't act like one, Porsche can provide it in a variety of flavors.

SUVs You Won't Hate

Porsche Macan GTS [+] Defiant exhaust note, obsessively detailed, stupefying stability. [–] Snug back seat, tamer handling. [=] All-around excellence ekes one out.

All share an inherent greatness. The Macan was our unequivocal comfort champ, even with sport seats so extreme that one must climb up over the thigh bolster to get out. From outside, both the Macan and the F-Pace sound spectacular. Associate online editor Joseph Capparella noted that if you heard them coming through the woods, you'd never expect these two little school buses to pop out. But climb aboard and fire them up, and the Jaguar, from the inside, just moans into consciousness, while the Macan starts with an authoritative snarl and settles into the bassy burble that identifies serious sporting machines.

Engage the launch control that comes with the Sport Chrono package, wind up the 3.0-liter twin-turbo six before releasing the brakes, and the Macan hits 60 mph in just 4.4 seconds, almost a full second ahead of the Jag. It maintains that lead through the quarter-mile, posting 13 seconds flat to the Jag's 13.9 and 105 mph to the leaper's 102. The PDK gearbox snaps off shifts so quickly that it sounds like a record skipping, but it's remarkably civilized under lighter loads as well. Originally a performance-enhancing development, this dual-clutch is now a model of smoothness for automatic transmissions of all types. And few vehicles on the market have better brakes than the Macan's firm and progressive pedal.

While the steering is nice and heavy, that's about the only thing it has going for it—except that it commands a more buttoned-down chassis. Even trying to upset the Macan by sawing at the wheel mid-turn doesn't do much. It simply follows its front axle around.

Opposite: The Macan's center console is so button-intensive, it looks like two battling keyboards. Above: It's light on space, but it's also light on its feet.

Both our drivers had exciting moments in the Jaguar over a lumpy chicane-like turn on our drive route, while the Porsche plowed over the crest unfazed.

Stuttgart's stylists withheld few flourishes on the Macan, from the recessed taillights with their protruding central rib to the shifter that looks like the metal bones of the Terminator's robotic forearm. The rest of the interior is a rich blend of soft black leather, Alcantara, brushed-aluminum trim, and contrasting stitching. It is, however, so overloaded with buttons that Porsche had to hide a few. The one to activate the heated steering wheel is tucked into the split bottom spoke. We discovered it by accident when lazily hooking a finger through the wheel on the highway. And the external release for the rear hatch is on the bottom of the rear-wiper mount. Owners, read your manuals. Button overload is a fact of life with modern Porsches.

That the brand's DNA can be translated so purely into a crossover is heartening. And that it's not the only brand doing such a good job is exponentially so. Maybe these two foretell a future strain of the crossover boom that morphs back into five-door cars and sports wagons. But even if that's not where the trend is leading, we like where it's already led.

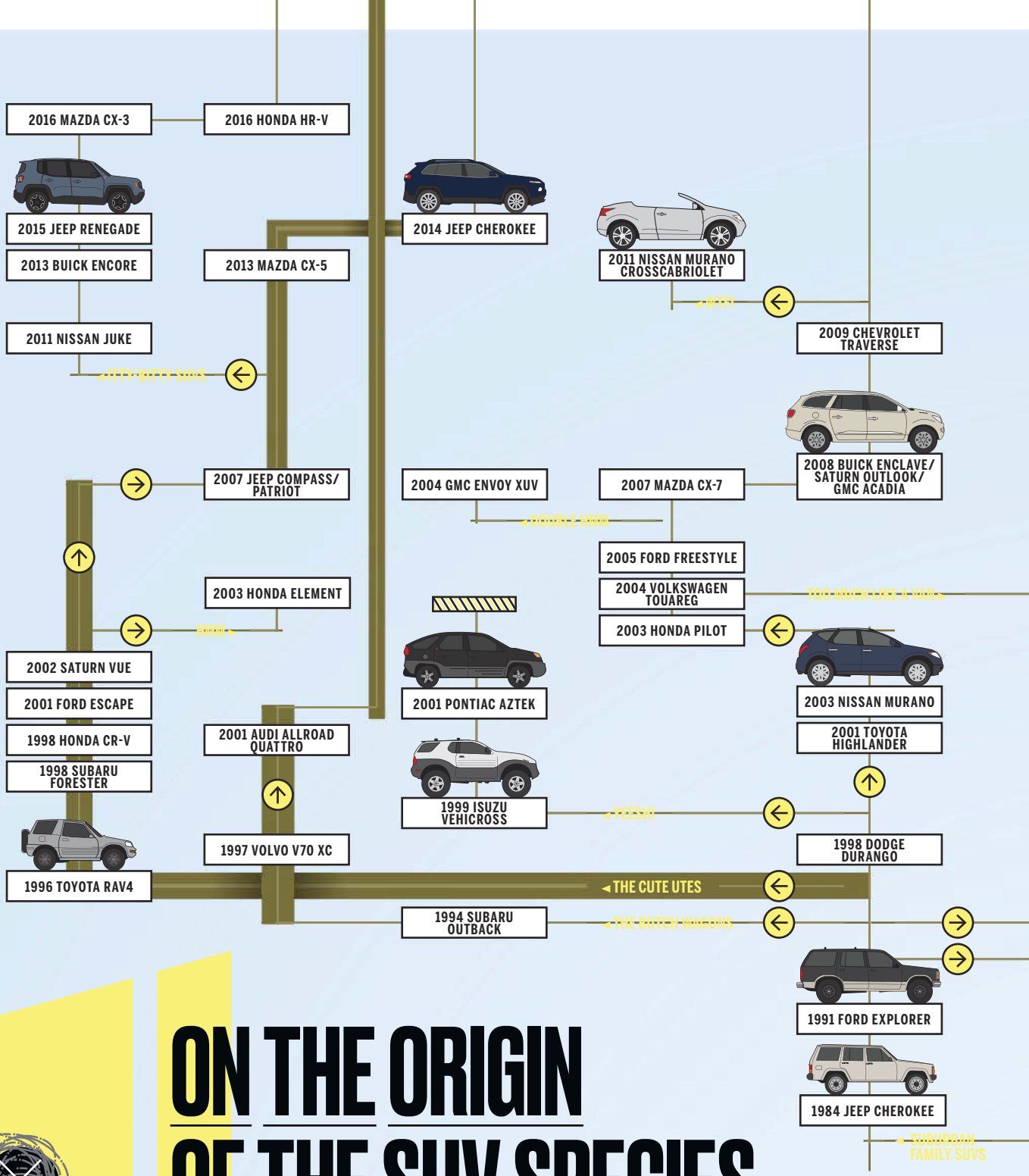
ALL-NEW
RIDGELINE

Introducing the **all-new 2017 Ridgeline**, with a dual-action tailgate and a lockable In-Bed Trunk®. Honda innovation, now inside a truck.

Ridgeline RTL-E shown. ©2016 American Honda Motor Co., Inc.

Honda smart.

HONDA



ON THE ORIGIN OF THE SUV SPECIES

SUVs You Won't Hate

WHO WOULD HAVE GUESSED when the SUV rumbled out of the automotive primordial soup that this simple truckish wagon form would come to dominate its environment? It started simply enough but, beginning about 25 years ago, the SUV mutated into a collection of disparate, dazzling, and sometimes-confounding forms. What we have here is the vehicular equivalent of the Cambrian explosion. Join us on a journey back through time as we map the evolution of the SUV from its wartime roots to today's many offerings. For our purposes, we consider an SUV to be a relatively high-riding, two-box design. But all bets are off because, well, because of the Suzuki X-90. —*Daniel Pund*

CAR AND DRIVER
NOV/2016

illustrations by POP CHART LAB

2019 LAMBORGHINI URUS

2018 JEEP GRAND CHEROKEE TRACKHAWK

2017 LAND ROVER RANGE ROVER EVOQUE CONVERTIBLE

2016 MERCEDES-BENZ GLE COUPE

2017 BENTLEY BENTAYGA

2017 JAGUAR F-PACE

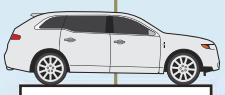
2014 PORSCHE MACAN

2014 BMW X4

2012 LAND ROVER RANGE ROVER EVOQUE

2010 ACURA ZDX

◄ LUXURY SUV CONVERTIBLE



2010 LINCOLN MKT

2010 BMW X5 M

2010 BMW X6 ACTIVEHYBRID

2008 CHEVROLET TAHOE/GMC YUKON/ CADILLAC ESCALADE

2009 BMW X6

◄ LUXURY SUV "COUPES"

◄ TWO-MODE HYBRID FAILURES

2007 AUDI Q7

2004 CADILLAC SRX

2003 VOLVO XC90

2006 JEEP GRAND CHEROKEE SRT8

2006 CHEVROLET TRAILBLAZER SS

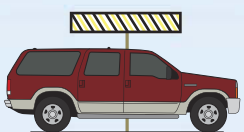
2004 NISSAN ARMADA

2004 CHRYSLER PACIFICA

2002 MERCEDES-BENZ G500

2004 INFINITI FX

2003 PORSCHE CAYENNE



2000 FORD EXCURSION

2003 HUMMER H2

2001 TOYOTA SEQUOIA

2001 ACURA MDX

2000 BMW X5

1999 CADILLAC ESCALADE

1999 LEXUS RX300

1998 MERCEDES-BENZ M-CLASS

2000 MERCEDES-BENZ ML55 AMG

◄ TYE TOO DIGGINS

1996 SUZUKI X-90

1997 FORD EXPEDITION

1998 LINCOLN NAVIGATOR

FUTURE RED BULL PROMOTION VEHICLE ►

TYE DIGGINS ►

1992 GMC YUKON

1993 JEEP GRAND CHEROKEE

1992 GMC TYPHOON

1992 HUMMER H1

1984 JEEP GRAND WAGONEER

HIGH-PERFORMANCE SUVS ►

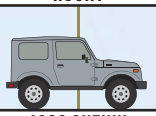
1986 LAMBORGHINI LM002

1989 GEO TRACKER

1988 DAIHATSU ROCKY

1970 LAND ROVER RANGE ROVER

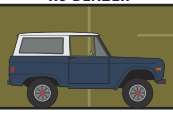
MILITARY FETISHISM ►



1986 SUZUKI SAMURAI

1969 CHEVROLET K5 BLAZER

LUXURY SUVS ►



1966 FORD BRONCO

1960 TOYOTA FJ40

1953 INTERNATIONAL HARVESTER TRAVELALL

1948 WILLYS JEEP STATION WAGON

THE JEEP CJ INNALOGUES ►

1948 LAND ROVER SERIES I

1935 CHEVROLET SUBURBAN CARRYALL

FOUNDATION STOCK

RUDY'S PRIDE

Audi gives Doktor Diesel's invention a triple boost.

_by Mike Duff

THE PROBLEM WITH SHARED platforms has always been persuading buyers to pay more for what's basically a fancier version of the same oatmeal. Sometimes the cheaper version even turns out to be more desirable, which might well be the case with the new Audi SQ7, if we can—with a straight face—put the words "cheap" and "new Audi SQ7" in the same sentence. In Europe, the Audi is just over half the price of its supposedly more covetable upmarket sisters.

Underneath, as with the standard Q7, this vehicle is closely related to the Bentley Bentayga and the Porsche Cayenne. But the range-topping SQ7 also gets the option of the Bentley's astonishing active anti-roll system and a body design that forgoes the Bentayga's Trumpian excesses. The SQ7 also gets a far more compelling engine—a new triple-boosted diesel V-8 that, frankly, makes the Bentley's newly redesigned gasoline W-12 already seem old and pointless.

The Audi's engine is a masterpiece. The 4.0-liter V-8 features sequential turbochargers, each fed gas from a separate exhaust tract, with the second turbo brought onboard when cam lobes slide laterally on the camshaft to engage the corresponding valves. That alone wasn't enough for Audi, and the SQ7 also is the first of its range to get a 48-volt electric supercharger. This sits downstream of the intercooler, as close to the engine as possible, and can spin up to 70,000 rpm in less than a quarter of a second, helping fill in as the first turbocharger gathers momentum.

We're told the Audi's herculean 664 pound-feet of torque is available at just 1000 rpm; that peak output corresponds

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

2017 AUDI SQ7

VEHICLE TYPE: front-engine, all-wheel-drive, 7-passenger, 4-door hatchback
BASE PRICE: $95,000 (est)
ENGINE TYPE: sequentially turbocharged, supercharged, and intercooled DOHC 32-valve diesel V-8; iron block and aluminum heads; direct fuel injection
DISPLACEMENT: 241 cu in, 3956 cc
POWER: 435 hp @ 5000 rpm
TORQUE: 664 lb-ft @ 1000 rpm
TRANSMISSION: 8-speed automatic with manual shifting mode
DIMENSIONS
WHEELBASE: 117.9 in
LENGTH: 199.6 in
WIDTH: 77.5 in
HEIGHT: 68.5 in
PASSENGER VOLUME: 136 cu ft
CARGO VOLUME: 15 cu ft
CURB WEIGHT: 5250 lb
PERFORMANCE (C/D EST)
ZERO TO 60 MPH: 4.7 sec
ZERO TO 100 MPH: 13.7 sec
1/4-MILE: 13.6 sec
TOP SPEED: 155 mph
FUEL ECONOMY (C/D EST)
EPA COMBINED/CITY/HWY: 24/21/30 mpg

A seven-passenger SUV that gets to 60 mph in less than five seconds, handles beautifully, and gets about 24 mpg in mixed driving? Yes, please.

exactly to both that of the Bentley's W-12 and the rated limit of the eight-speed automatic transmission. And we're told that, were it not for the transmission limit, the TDI could generate significantly more. We estimate that fuel economy will be at 21/30 mpg city/highway and 24 mpg combined.

Yet it doesn't feel like a diesel. The engine sounds pretty much like an old-fashioned, big-cube gasoline V-8, both inside the cabin and outside the ute. It revs with an enthusiasm unusual for engines without spark plugs, pulling to the 5100-rpm cutoff (in manual shifting mode) without top-end hesitancy. Yes, it's slower than the Bentayga—Audi claims a 4.8-second zero-to-62-mph time—but the sheer accessibility of its performance means that it feels every bit as quick in the real world. Small wonder that Bentley is planning to use the same engine in the Bentayga to create its first diesel-powered vehicle next year.

The rest of the SQ7 driving experience is that of a slightly firmer Q7. The air springs and switchable dampers are standard, with European buyers also able to pay extra for the 48-volt electromechanical anti-roll system that's standard on the Bentayga. This works as billed, keeping the Audi almost flat under the sort of cornering loads that would capsize a lesser SUV. There's still no doubting it's a big, heavy thing—though Audi claims it's about 374 pounds lighter than the Bentley—and that mass makes its presence felt most in slower turns. But for the most part, it's a credible performance vehicle that just happens to be a diesel-powered SUV.

Despite the fact that the SQ7 has been engineered to meet U.S. emissions standards, it's still not confirmed for sale here. For that, blame Dieselgate. It would be a tragedy compounded if that scandal denied us this mighty and capable sled.

ASK THE MAN WHO OWNS ONE: AUDI Q7 TDI

By Eddie Alterman

I'm finding it impossible to summon the level of righteous indignation expected of Audi/Porsche/VW diesel owners these days. My SUV is just too good.

The go-to vehicle in our family is the 2014 Audi Q7 TDI. It does it all. It schleps the kids and their friends and their gear to softball practice, to camp, to wherever the hell kids go to chase Pokémon these days. It charges away from stoplights, drawing on a store of low-down torque that can only be described as elemental. Both its interior and its ride somehow manage to be simultaneously uncomplicated and sumptuous; it's a no-BS affair built for long, stressless days behind the wheel. I have managed to coax nearly 700 miles from its 26.4-gallon tank.

It has an understated road presence for something so very large and so very in charge. I even like the way it looks better than the new one. This almost never happens. I'm usually desperate to keep up with the product, cursing the relentless march of ever-improving style and engineering. Even though the new Q7 drives marvelously and is loaded with aluminum and all sorts of glass-cockpit electronics, I just can't see us in it. It looks like an overfed Dodge Journey.

And now that there's no diesel available for VW Group products, our Q7 is looking increasingly irreplaceable. I don't want to sell it back to Audi, and I don't want to get whatever fix is in the works, including swapping a smog-producing emission (NO_x) for a greenhouse-gas emission (CO_2). Like all TDIs, the Q7 has been painted as evil, a polluting scourge, a member of a toxic fleet. The truth is more nuanced. Besides, it looks great in black.

illustrations by ANDY POTTS

SUVs You Won't Hate

ASK THE MAN WHO OWNS ONE: MAZDA CX-5

By Josh Jacquot

Crossover SUVs are appliances, the toasters of autodom, purchased and driven by pragmatic people making pragmatic choices. They're as ubiquitous as they are routine, crawling through Piggly Wiggly parking lots and plugging along in middle-school pickup lines. Like refugees of a child-free lifestyle, most have fully surrendered themselves to domestic duty. Crossovers meet the need. They check the box. But they don't light any fires. Loving one doesn't come naturally to me.

Yet, I do. I own a 2016 Mazda CX-5, and I love it.

I love it because I don't feel the weight of domestic burden every time I turn the steering wheel. I don't have to. Because it turns like a car. Better than many cars, in fact. When the CX-5 was introduced, Mazda engineers wheeled the crossover around Mazda Raceway Laguna Seca faster than the smaller, lighter Mazda 3 with the same powertrain. Unlike many of its counterparts, it's not just an A-to-B appliance with good visibility and cargo space. Rather, it's a carefully crafted driving machine that happens to offer those virtues. Even the details are right.

Like all Mazda SUVs, its stability control can't be disabled. An attempt to thwart mid-winter parking-lot donuts, perhaps? To diminish fun on gravel roads? To keep a relatively tall vehicle safe from the haunting left hook of physics? Actually, it's only that last one, because Mazda nailed the stability-control calibration on the CX-5 so perfectly that it will allow modest, controlled four-wheel slides. The mundane trivialities of make-it-safe-and-forget-it stability-control tuning weren't lost on the minds at Mazda. In fact, they weren't trivialities. Because to Mazda, as to us, what happens when you turn the wheel and push the pedals actually matters.

Mazda is a small company with a big sense of identity. It knows what it is and what it makes. It knows that people buy Mazdas for a reason. It won't sacrifice that identity on the altar of market share. It's happy to stay small by making driving machines that also function pragmatically. And that, at this stage of my life, is exactly what I need.

CHEVROLET SUBURBAN

There are precious few constants in the automotive world, but for the vast majority of the living population, there has always been a Chevy Suburban—by our reckoning, the first SUV. Just a windowed wagon body on a rear-drive, half-ton truck frame when it arrived in 1935, the Suburban's general configuration, construction, and body style nonetheless previewed what would eventually be called an SUV. It evolved through the decades but fully blossomed during the big sport-ute boom of the early '00s and has survived the market's subsequent evolution toward less-capable and lighter crossovers. The Suburban has remained a sturdy, body-on-frame draft mule, with an 8300-pound max towing capacity, up to nine seats, and optional four-wheel drive. We're enticed by its Ford competitor—the fashionably modern, twin-turbocharged V-6 Ford Expedition—but the Suburban remains the original, the blueprint of SUVs.

photograph by JOHN ROE

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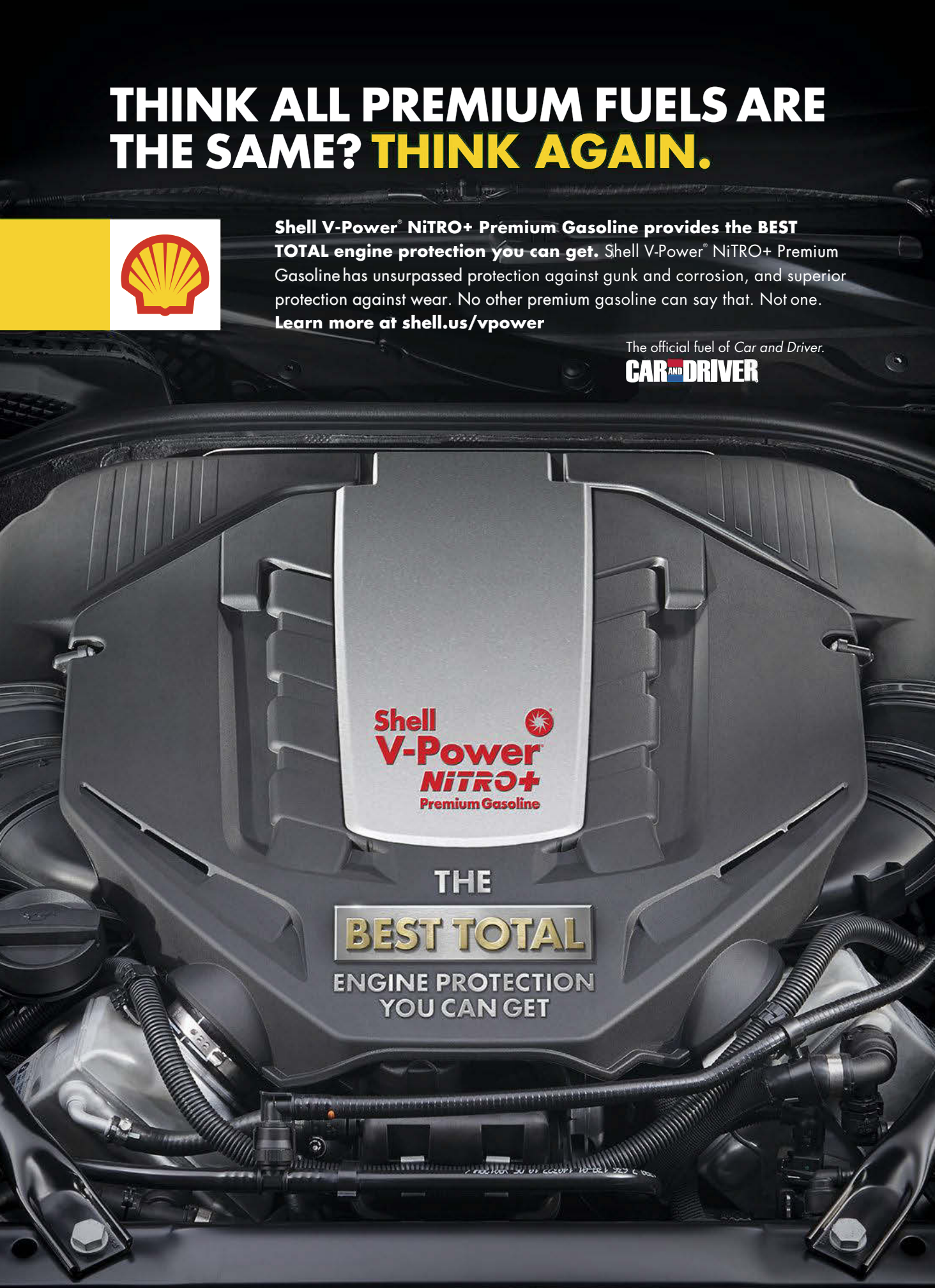

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

ASK THE MAN WHO OWNS ONE: JEEP WRANGLER UNLIMITED

By Jared Gall

After I lost Lloyd, my brain-damaged cat who had vertigo and used to fall out of trees, I never thought I'd love anything so slow this much. But for some reason, two years ago, we bought a Jeep Wrangler Unlimited for my wife. Actually, the reason was simple: She wanted a convertible with four doors that could be used as a tow vehicle. Being cripplingly indecisive, I liked her criteria because they narrowed our choices down to one.

I love putting the top down, which is an immediate experiential upgrade. After two years, we can get it down in about two minutes. I love that all four doors come off—call that a 10-minute job. The exposure is as close as someone with terminally bad judgment needs to get to a motorcycle. I love that it's got a manual—not a great one, mind you, but whatever.

And I love the Jeep community. Another Jeeper pointed to my filthy Wrangler at a gas station once and asked where I got my mud. Did you know it's customary for Wrangler drivers to wave to each other when they pass on the road? How rare is it today that strangers bother to acknowledge and affirm one another? Once, while driving a 911 Turbo S, I tried waving to other Porsche drivers. I just got scowls in return, so I switched the wave to a middle finger. When you're the one in the Turbo S, it's your prerogative.

Yes, the Wrangler's tires are loud. Yes, its handling is abysmal. And yes, it struggles to maintain 75 mph in sixth gear while towing our small enclosed trailer. But we love the Jeep because it is great at being what it is and doesn't much try to be anything else. It's not an anodyne, ordinary vehicle and so by its very nature inhibits anodyne, ordinary experiences. So we drop the top. We stash the doors in the garage. We chase sunsets—slowly—while the passenger stands above the header, wind in their face. We go Jurassic Parking, crashing through the woods while listening to the movie soundtrack and howling with laughter at every perfectly timed bird screech. But most of all, we go and we do, because the Wrangler lends even the smallest errand a sense of occasion and adventure.

2017 MAZDA CX-9

Buying a three-row SUV might mean your two-seat roadster days are behind you, but Mazda's CX-9 manages to infuse some of the handling and attitude of a sports car into family transport. Where others its size are oafish, the CX-9 moves with grace and precision. The 250-hp 2.5-liter turbo four might not win you any drag-racing trophies, but it works in silence, responds quickly, and delivers a surge of easy power. And its sophisticated design makes it look much more expensive than its $32,420 starting price. The CX-9 proves that a shift in automotive priorities doesn't mean disappointment.

photograph by JOHN ROE

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THE UPPER

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

CRUST

With apologies to Will S., we sample these royal thrones of kings, these scepter'd isles, these earths of majesty, these seats of Mars, these other Edens, demi-Paradise.

_by Aaron Robinson

_photography by Scott Toepfer

▲

BENTLEY BENTAYGA
Price: $281,100 • Power: 600 hp
Torque: 664 lb-ft • Weight: 5703 lb
0–60 mph: 3.5 sec

▲

LAND ROVER RANGE ROVER SVAUTOBIOGRAPHY
Price: $202,935 • Power: 550 hp
Torque: 502 lb-ft • Weight: 5950 lb
0–60 mph: 5.2 sec

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

FASHIONS CHANGE. A wealthy gent who once might have expressed his good fortune with a Mercedes-Benz 450SEL or a Rolls-Royce Silver Shadow, both grand barouches for the pedigreed elite of the 1970s, today might roll in something that looks like an International Scout after disastrous plastic surgery. It's been 25 years since the sport-utility craze took off in earnest and 24 years since the first prediction of the segment's impending demise. But regardless of their income, people like sitting up in the clouds, they like being able to roll carefree over crumbling infrastructure, and they always like having more space.

And carmakers just can't raise the prices high enough. You can now drop 100 grand on a Cadillac Escalade—six digits for the Saks Fifth Avenue Suburban, the Suburbillac. No matter how many zeros get tacked on to these Colony Parks and Estate Wagons and Shooting Brakes

BALLYS
WAYNE

Call us traditionalists, but we prefer the interior of the British vehicle brought to us by the Indian conglomerate to the one from the German megacorp.

SUVs You Won't Hate

with overactive pituitaries, there are wallets willing to open wide enough. Thus enters—to gilded long horns trumpeting—England, the emerald jewel of the North Sea, that noble carriage maker to kings and emperors and half-assed Idi Amins with good mechanics on staff.

Any discussion of British automotive heraldry is not complete without a nod to Land Rover and its luxury line, Range Rover, which has been supplying four-low and lockers to the Queen's household for as long as anyone can remember. The cheapest Range Rover you can buy (not the Sport and not the, ahem, Evoque, but the real Range Rover) is $85,945. The cheapest long-wheelbase Ranger is $109,190. So it is not unfair to say that our long-wheelbase SVAutobiography, at $202,935, is a car with, more or less, a *hundred grand* in options. Believe it or not, there's a Holland & Holland model that goes for $245,495, but avoid that one because, you know, you'll shoot your eye out, kid.

Meanwhile, Volkswagen-owned Bentley has named its first SUV after a rocky partridge roost on an island off Africa's western coast, proving that Germans are hilarious even when they're not trying to be. Our $281,100 Bentley Bentayga came rendered in Hallmark Metallic with Beluga-over-Camel-colored leather and a veneer of "dark, fiddleback eucalyptus," indicating that the Bentayga's catalog reads like an issue of *Wine Spectator*. In testing, this 5703-pound sled was exactly as quick in the quarter-mile as a Ferrari F40, and it amuses the imagination to wonder what songs Gilbert and Sullivan would have written about this very model of a modern minor miracle.

Land Rover Range Rover SVAutobiography [+] Very pretty inside, legroom of the admiral's cabin, classic styling. [–] Ponderous handling, stiff seats, both slower and thirstier. [=] What you'd want for that five-star Saharan expedition.

Buying the 600-hp Bentayga or the 550-hp Range Rover would not be at all like buying a Roller or a Mercedes-Benz S-class or a Cadillac limo with a boomerang aerial or any of the big cars we formerly associated with financial achievement. That's because these mega-dollar utes eschew the baroque pageantry that used to define luxury cars in favor of a new hyperposh utilitarianism akin to a diamond-studded Leatherman. Call it clodhopper chic.

2. RANGE ROVER SVAUTOBIOGRAPHY

Everybody thought the price was crazy until they saw the lunch trays. In the back, where Jaguar Land Rover's clandestine-sounding Special Vehicle Operations (hence the SV in the name) installed two lounge seats that look pilfered from the business-class section of an Emirates A380, there are his and hers lunch trays. Not only that, they are motorized.

Push a secret button under the armrest, and a door in the cavernous center console whispers open. Before you can cry, "Great Lucas, Prince of Darkness!" up thrusts a polished-aluminum sculpture, rising from the depths like Stromberg's undersea fortress in *The Spy Who Loved Me*. It motors quietly to full vertical, now looking like a freeway billboard emerging from a chrysalis, then . . . stops. Silence. You stare at it for a few moments, wondering what witchcraft will happen next, before realizing that you have to fold it down manually. Ta-da! Push another button (after folding it up), and it sinks out of sight.

The trays plus a champagne-bottle chiller also concealed by electrified doors, a separate refrigerator under the front armrest, a pair of seatback screens we could never figure out, seats with at least a dozen electric adjustments including numerous modes of back massage, self-closing doors (one of which stopped working), and half of the Hundred Acre Wood for dash trim are just some of the things that an extra hundred grand buys. Really, we make fun, but the interior of the Ranger is both beautiful and, because of the 7.8-inch wheelbase stretch over regular Range Rovers, limousine spacious. If you're trying to decide whether to send this or the Bentayga to the airport to pick up the visiting Sultan of Schenectady, this is the one.

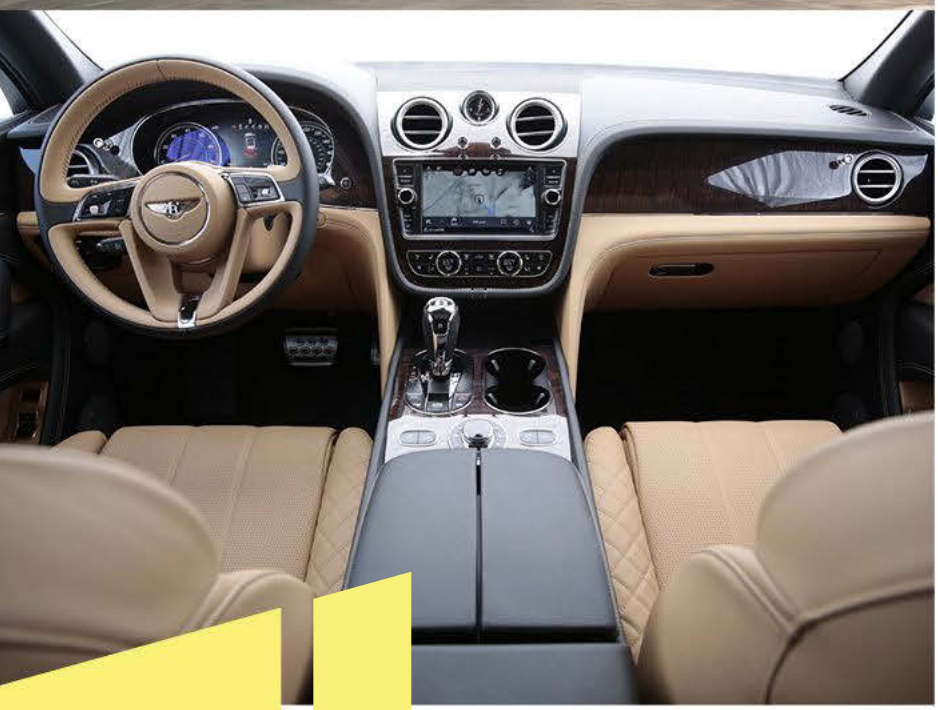
The throaty power supplied by the supercharged 5.0-liter V-8 is plenty to move 5950 pounds in a way that will sicken passengers. A 5.2-second 60-mph time seems pokey only in the company of the ridiculously quick Bentayga, which runs on the same stuff that

	2017 BENTLEY BENTAYGA	2016 LAND ROVER RANGE ROVER SVAUTOBIOGRAPHY
PRICE AS TESTED	**$281,100**	**$202,935**
BASE PRICE	$235,525	**$200,490**
DIMENSIONS		
LENGTH	202.4 in	204.7 in
WIDTH	78.7 in	78.1 in
HEIGHT	68.6 in	72.4 in
WHEELBASE	117.9 in	122.8 in
FRONT TRACK	66.5 in	66.5 in
REAR TRACK	66.7 in	66.3 in
INTERIOR VOLUME	**F: 57 cu ft** **R:** 52 cu ft	**F:** 54 cu ft **R: 61 cu ft**
CARGO SPACE	15 cu ft	**32 cu ft**
TOWING		
MAX	7500 lb	**7716 lb**
POWERTRAIN		
ENGINE	twin-turbocharged DOHC 48-valve W-12 363 cu in (5950 cc)	supercharged DOHC 32-valve V-8 305 cu in (5000 cc)
POWER HP @ RPM	**600** @ 6000	550 @ 6500
TORQUE LB-FT @ RPM	**664** @ 1350	502 @ 3500
REDLINE/FUEL CUTOFF	6250/6400 rpm	6800/6500 rpm
LB PER HP	**9.5**	10.8
DRIVELINE		
TRANSMISSION	8-speed automatic	8-speed automatic
DRIVEN WHEELS	all	all
GEAR RATIO:1/ MPH PER 1000 RPM/ MAX MPH	❶ 4.71/6.7/43 ❷ 3.14/10.0/64 ❸ 2.10/15.0/96 ❹ 1.67/18.8/120 ❺ 1.29/24.4/156 ❻ 1.00/31.4/187 ❼ 0.84/37.4/187 ❽ 0.67/47.3/180	❶ 4.71/5.7/37 ❷ 3.14/8.5/55 ❸ 2.10/12.8/83 ❹ 1.67/16.0/104 ❺ 1.29/20.9/136 ❻ 1.00/26.8/136 ❼ 0.84/31.9/136 ❽ 0.67/40.0/136
AXLE RATIO:1	2.85	3.31
CHASSIS		
SUSPENSION	**F:** multilink, air springs, anti-roll bar **R:** multilink, air springs, anti-roll bar	**F:** multilink, air springs, anti-roll bar **R:** multilink, air springs, anti-roll bar
BRAKES	**F:** 15.7-inch vented disc **R:** 15.0-inch vented disc	**F:** 15.0-inch vented disc **R:** 14.4-inch vented disc
STABILITY CONTROL	fully defeatable	partially defeatable
TIRES	Pirelli Scorpion Verde All Season 285/45R-21 113W M+S	Continental Cross-Contact LX Sport 275/40R-22 108Y M+S

CAR AND DRIVER TEST RESULTS

ACCELERATION		
0–30 MPH	**1.3 sec**	2.0 sec
0–60 MPH	**3.5 sec**	5.2 sec
0–100 MPH	**8.9 sec**	12.7 sec
0–130 MPH	**16.3 sec**	23.8 sec
1/4-MILE @ MPH	**12.1 sec @ 115**	13.8 sec @ 104
ROLLING START, 5–60 MPH	**4.3 sec**	5.8 sec
TOP GEAR, 30–50 MPH	**2.5 sec**	**2.5 sec**
TOP GEAR, 50–70 MPH	**2.9 sec**	3.3 sec
TOP SPEED	**187 mph** (mfr's claim)	136 mph (gov ltd)
CHASSIS		
BRAKING, 70–0 MPH	195 ft	**188 ft**
ROADHOLDING, 300-FT-DIA SKIDPAD	**0.78 g**	**0.78 g**
WEIGHT		
CURB	**5703 lb**	5950 lb
%FRONT/%REAR	55.9/44.1	48.9/51.1
FUEL		
TANK	22.5 gal	**27.7 gal**
RATING	91 octane	91 octane
EPA COMBINED/ CITY/HWY	15/12/**19** mpg	**16/14/19 mpg**
***C/D* 750-MILE TRIP**	**16 mpg**	14 mpg
SOUND LEVEL		
IDLE	44 dBA	**43 dBA**
FULL THROTTLE	75 dBA	**70 dBA**
70-MPH CRUISE	**61 dBA**	62 dBA

tested by TONY QUIROGA *and* AARON ROBINSON *in California City, CA*



FINAL RESULTS

Shell V-Power Nitro+ Premium Gasoline
The Official Fuel of CAR AND DRIVER

	Maximum points available	▲ 2017 BENTLEY BENTAYGA	2016 LAND ROVER RANGE ROVER
RANK		1	2
VEHICLE			
DRIVER COMFORT	10	**10**	8
ERGONOMICS	10	**8**	7
REAR-SEAT COMFORT	5	**4**	**4**
REAR-SEAT SPACE*	5	2	**5**
CARGO SPACE*	5	2	**5**
TOWING CAPACITY*	5	**5**	**5**
FEATURES/AMENITIES*	10	9	**10**
FIT AND FINISH	10	8	**9**
INTERIOR STYLING	10	9	**10**
EXTERIOR STYLING	10	4	**8**
REBATES/EXTRAS*	5	0	0
AS-TESTED PRICE*	20	12	**20**
SUBTOTAL	105	73	**91**
POWERTRAIN			
1/4-MILE ACCELERATION*	20	**20**	12
FLEXIBILITY*	5	3	**4**
FUEL ECONOMY*	10	**10**	8
ENGINE NVH	10	**10**	9
TRANSMISSION	10	**10**	9
SUBTOTAL	55	**53**	42
CHASSIS			
PERFORMANCE*	20	19	**20**
STEERING FEEL	10	**9**	5
BRAKE FEEL	10	**8**	7
HANDLING	10	**8**	5
RIDE	10	**9**	**9**
SUBTOTAL	60	**53**	46
EXPERIENCE			
FUN TO DRIVE	25	**23**	17
TOTAL	245	**202**	**196**

These objective scores are calculated from the vehicle's dimensions, capacities, rebates and extras, and/or test results.

lights the Milky Way. However, there's less satisfaction behind the Rover's wheel than in the three other opulently leatherized seating positions, mainly due to steering that is as numb as a severed limb. The Ranger becomes laborious once the road twists because of its dim steering and relatively tipsy body control. Chasing the coolly proficient Bentayga in it is like trying to run the Rally Catalunya in a Guatemalan mountain bus, though at least the Ranger has good brakes.

Uneasy lies the head that wears a crown, and uneasy sits the butt that rides in the crown's Range Rover. These seats are excessively firm, and the front bottom cushions are short, leading to arse naps and vicious attacks of the tingles at every stop. The rear thrones recline luxuriantly, and there's enough room to raise the big pizza peel of a leg rest, though perfect comfort was never achieved there, either. The softer padding found in the Bentley would go a long way in helping here.

A full complement of off-roading hardware and software plus control-tower outward visibility make the Ranger the more expedition-ready of the two. And let's face it: A Range Rover has just got that familiar look of slightly crusty class to it. It's absurdly overengineered for the life it's likely to lead, but then, so was poor Lady Jane Grey, the so-called Nine-Day Queen. When you're talking about British royalty, things can get pretty silly.

SUVs You Won't Hate

Bentley Bentayga [+] Unnaturally quiet, handles curves, will take the pink slip off almost anything. [–] The veneer over the inner Audi thins in places, not handsome, cut-lines aplenty. [=] A strange, tall luxury wagon trying hard to be a real Bentley.

1. BENTLEY BENTAYGA

You have to see the tailgate bench to believe it. According to our own Tony Quiroga, who knows about such things, Bentley was jealous of the Range Rover's split tailgate, the lower third of which folds down (electrically, of course) to supply a handy bench to sit on. Bentley figures the Bentayga is just as likely to end up at polo-field bacchanals, so the Event Specification option ($3200) includes a "rear event seat" that is a leather-wrapped and diamond-stitched table that slides out—after you've spent 20 minutes screwing with it and finally resort to either the owner's manual or a hammer—to supply the same comfort as sitting on a butcher's block. Unless you are Edward Longshanks, your legs dangle.

Options, baby! The Bentayga starts at $235,525, but to give it many of the same features as the Rover, it needed stuff. For $11,015, it gets the four-bucket executive seating divided by a hefty center console which, alas, lacks motorized lunch tables or a champagne chiller. It does have much more usable tablet-style rear monitors ($7155) and a fancy Naim stereo system ($4690) through which you can hear the nose-hair rustling of the newsreaders on NPR.

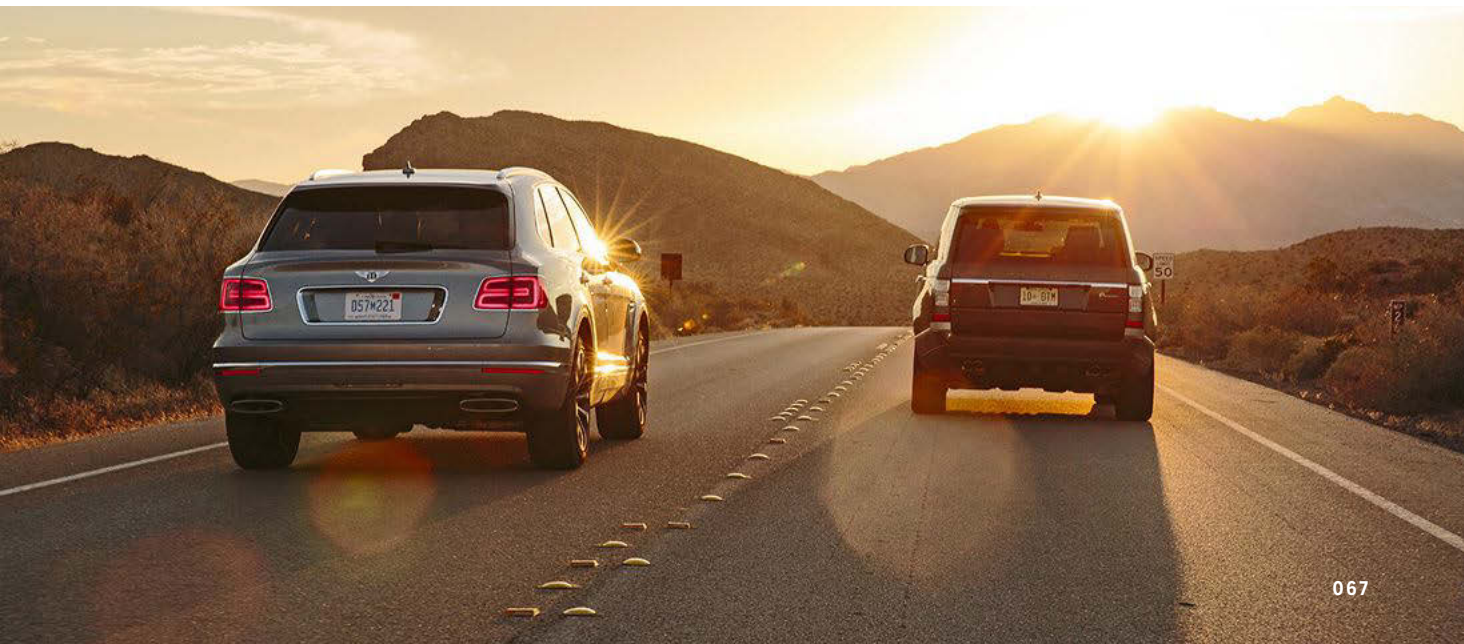
That's because the Bentley is exceptionally quiet. No kidding, it is like being inside a Lexus at the bottom of a coal shaft. Start the engine and . . . nothing. Where the Rover's V-8 transmits the slightest shakes of actual internal combustion, the Bentley is as inert as El Capitan. Ditto for when you floor it. The world outside goes blurry, but you feel *nada* from all the spinning and reciprocating and ticking and oil-sloshed parts of the W-12, or from the eight-speed automatic, or the numerous driveshafts, or even the gigantic 285/45 tires on 21-inch wheels. By comparison, most cars you've ever driven sound and feel like a two-stroke Kawasaki.

Ettore Bugatti once snootily said of W.O. Bentley: "He builds fast trucks." Imagine the sneer on Bugatti's face if he could see the Bentayga's styling.

This, folks, is why you pay the Bentley's big bucks. This plus the exceptionally comfortable seats and the performance stats, which are simply unbelievable. Three-point-five seconds to 60? Remember when the Ferrari Enzo hit 60 in 3.3 and we all bowed in submission? And it's got handling, too, with direct steering and masterful body control and stunning brakes, taking corners like a—well, not a Ferrari, exactly, but a pretty nice Audi at least.

Oops, we said it, the A-word. No matter how much diamond-stitched leather and wood veneer this car gets buried under, it feels a bit like a gussied-up Audi. Too many similarities in the control layout and too many cut-lines in the body panels. Bentleys are renowned for their sculpted-from-one-block look, the panel seams minimized or hidden. Not the Bentayga. It's got body-part lines everywhere that metal meets metal, metal meets plastic, and, in a couple of places where the panels of our car were misaligned, metal meets air. Particularly unsightly are the separate finishers (plastic?) tacked on to the wheel arches.

The brand's spider-eye styling theme doesn't work here, being a little too bulbous, rather plain at the rear, and altogether not quite graceful. Like Old Coppernose himself, Henry VIII. The expected longer-wheelbase version may help, as should the gen-two redesign. Meanwhile, all hail the king of crossovers, a true Hotspur if ever there were one.



SPORT-UTILITY VINTAGE

SUVs are recent entrants to the collector-car marketplace. Here are some of the best:

SUVs You Won't Hate

CAR AND DRIVER
NOV/2016

TWO TOYOTANS

Anyone who went to high school during the *Dazed and Confused* era knows there were two things that the jocks and stoners agreed on: the one cool weed-smoking cheerleader and the Toyota FJ40 Land Cruiser. But as the jocks and stoners grew up, made some money, and wanted their memories back, better-than-new Land Cruisers started showing up at big-time auctions. Prices soared, with some FJs hitting six figures.

If that prices you out of an FJ40, try looking for the next big thing, the first-generation Toyota 4Runner. Its back story is just as interesting as Toyota's Jeep clone, as the 4Runner started out as the Hilux pickup, the darling of insurgents on multiple continents. The infamous "chicken tax" of 1963 placed punitive tariffs on imported small pickups, but, with the addition of a removable shell and two seats in the bed, it became the 4Runner sport-utility vehicle. Brilliant. Toyota 4Runners look great and last forever in kind climates, where good ones show up on Craigslist for around $10,000.

GRAND ROVERS

After building the Liberty transport ships that aided in winning World War II, Henry J. Kaiser unwittingly helped create the luxury SUV by merging his Kaiser Motors with the original Jeep maker, Willys-Overland, in 1953. The first Jeep Wagoneer arrived a decade later, and it would take two more decades for it to gain the "Grand" prefix and all the accompanying amenities that make the appellation true. Like the FJ40, the few remaining good ones are pricey.

It's a different story with the classic Range Rover. Where the wood-sided Wagoneer is high kitsch, the original 1970 Land Rover Range Rover is a clean and timeless piece of 20th-century industrial art, and nice ones are still dirt cheap, trading in the $10,000 range.

In truth, both the Grand Wagoneer and the Range Rover were considered fairly crappy vehicles. The assembly plants for these two might be 3800 miles apart, but both were thrown together with a similar indifference. But if you want to look like landed gentry, a Nissan Murano won't do.

RAIDERS OF THE LOST TRUCKS

Badly put together though they may have been, Land Rovers had style, especially the Defender 90 and 110, so named for their wheelbase measurements in (rounded-up) inches. North America got legal 90s for three model years—1994, '95, and '97—and the best of them can easily top $100,000. Importing earlier models from Europe under the 25-year rule is risky, with Defenders tending to be worn-out or fraudulently backdated. The feds are wise to this.

The great secret here is that you can get some of the Defender's style and off-road capability combined with Japanese reliability in the first-generation Mitsubishi Montero (also sold as the Dodge Raider in two-door trim). Mitsu even aped the Defender's LWB and SWB body styles. While the roof might not come off the two-door, neither will this Paris-Dakar winner strand you in the middle of the Mojave. About $7000 buys one in very good condition, though some parts are getting scarce.

THE WEALTHY CHOICE

Toyota FJ40 (1960–1983)
VALUE: $35,000–$65,000*

Jeep Grand Wagoneer (1984–1991)
VALUE: $12,000–$20,000*

Land Rover Defender 90 (1994–1995, 1997)
VALUE: $40,000–$80,000*

THE STEALTHY CHOICE

Toyota 4Runner (1984–1989)
VALUE: $8000–$12,000*

Land Rover Range Rover "Classic" (1987–1996)
VALUE: $6000–$10,000*

Mitsubishi Montero (1983–1991)
VALUE: $5000–$7000*

*Good to very good condition

illustrations by ANDY POTTS

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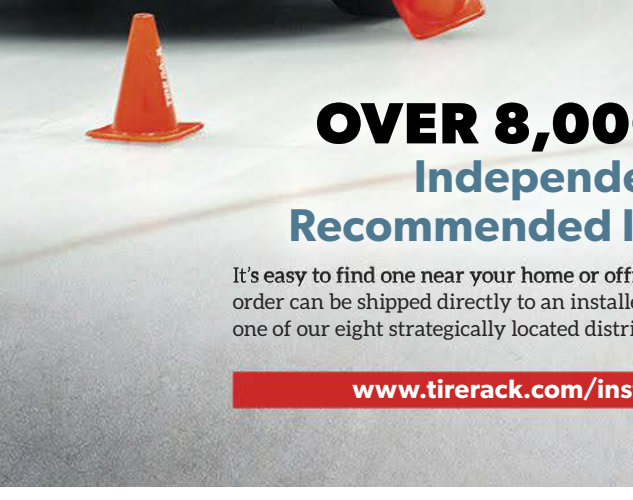

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- BLIZZAK WS60
- BLIZZAK WS70
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- ECOPIA EP422
- ECOPIA EP422 PLUS
- POTENZA RE050/RE050A
- POTENZA RE-11
- POTENZA RE-71R
- POTENZA RE760 SPORT
- POTENZA RE97AS
- POTENZA RE970AS POLE POSITION
- POTENZA RE960AS POLE POSITION RFT
- POTENZA S-04 POLE POSITION
- TURANZA SERENITY PLUS
- DUELER H/L 422 ECOPIA
- DUELER H/L ALENZA
- DUELER H/L ALENZA PLUS
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A HUGE SELECTION OF OVER 1,300 DIFFERENT WHEELS

OZ **Alleggerita HLT**
16 17 18

OZ **Leggera HLT**
18 19 20

NEW
OZ **Ultraleggera HLT**
19 20

NEW
OZ **45th Anniversary**
17 18

NEW
OZ **Aspen HLT**
20 21

OZ **Superturismo Dakar**
20 21

NEW
ASA **GT13**
18 19 20

Enkei Tuning **TS-10**
17 18

Enkei Tuning **TY-5**
18 19

Sport Edition **A13**
16 17 18

Sport Edition **A9**
16 17 18

Sport Edition **P3**
16 17 18

See Them on Your Vehicle!

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Enkei Perf. **PSR5**
15 16 17 18

Enkei Perf. **RSF5**
15 16 17 18

Enkei Perf. **X-Over**
17 18 20

NEW
Advanti **Diviso**
18 19

Advanti **Rasato**
17 18 19 20

What About TPMS?

We can assist you in selecting wheels that are compatible with your vehicle's sensors. We also offer an extra set of sensors for all TPMS systems, so your tire and wheel package can arrive with sensors already installed.

Sparco **Assetto Gara**
14 15 16 17 18

Sparco **Pro Corsa**
17 18

Sparco **Terra**
16 17

Sparco **Trofeo 5**
17 18

ALUTEC **Drive**
17 18

ALUTEC **Monstr**
16 17 18 19

ALUTEC **Raptr**
16 17 18

BRAKES akebono brembo Centric Parts dbaUSA GOODRIDGE HAWK PERFORMANCE STOPTECH

SUSPENSION BILSTEIN Eibach H&R HOTCHKIS SPORT SUSPENSION KONI KW KYB SPC PERFORMANCE SC WHITELINE

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'17 Ford Mustang Fastback
235/55R-17 Goodyear Ultra Grip Ice WRT
17x7 MSW Type 19

'17 Audi A4 2.0T Quattro Premium
225/50R-17 Pirelli Winter Sottozero 3
17x7.5 Andros Spec J

'16 Toyota Tundra 4WD
255/70R-18 Bridgestone Blizzak DM-V2
18x8 RIAL W10X

WHICH PERFORMANCE CATEGORY IS RIGHT FOR YOU?

High-Tech Winter Traction

STUDLESS ICE & SNOW

Developed to provide ice and snow traction similar to studded winter tires without using studs, these tires typically trade high-speed ratings and some handling responsiveness for enhanced snow and ice traction.

PERFORMANCE WINTER / SNOW

Developed as high-speed winter tires for European driving conditions, these tires typically trade some deep snow and ice traction for enhanced dry and wet road traction, handling and high-speed capability.

Traditional Winter Traction

STUDDABLE WINTER / SNOW

Developed to accommodate optional metal studs that enhance ice and hard-packed snow traction. When studded (studding available for $15 per tire), these tires typically trade some noise and ride comfort for extra ice and packed snow traction. When not studded they provide a low-cost winter tire option.

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SAMPLE PACKAGES

'16 Volkswagen Golf Sportwagen
195/65R-15 Dunlop Winter Maxx
15x6 ALUTEC Grip

'16 Jeep Cherokee Sport 4WD
225/60R-17 Continental WinterContact SI
17x7.5 Sport Edition P3

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2017 Acura NSX ▾

The Prophet

The resurrected NSX previews the hybridized future of supercars and sports cars.

_by Eric Tingwall

_photography by Greg Pajo

If a 3868-pound, all-wheel-drive hybrid strikes you as a curious sequel to the original bantamweight NSX, you're not alone. As vehicle-performance lead engineer Jason Widmer tells it, the initial prospect of a gas-electric NSX caused as much hand-wringing within Honda's hallways as raised eyebrows outside them. In the early days of the new car, NSX mules consistently laid down faster laps without the battery-electric assist system that was supposed to make the thing quicker.

That was more than five years ago, and the NSX's hybrid-electric system is now a fully developed piece of go-faster kit. The car rolling out of Marysville, Ohio, seamlessly combines two turbochargers, three electric motors, four driven wheels, six cylinders, and nine forward gears to produce bona fide supercar performance. That won't make it any less controversial; there are an infinite number of ideas as to what a resurrected NSX should have been. The concept that won out is a rolling testbed for the future of performance technology. "You will not find a car in this category in 10 years that won't have electrification. I'm confident on that," Widmer says.

So are we. The NSX isn't the first of its kind to mesh electrons and hydrocarbons in the pursuit of speed, but give Acura credit for so rapidly democratizing the technology. Even with a starting price of $157,800, the NSX is hard evidence of the kind of trickle-down economics that actually works. Sacrificing a fraction of the performance and the pure-electric driving capability of the 2015 Porsche 918 Spyder netted Acura a $700,000 price cut for its mid-engined hero.

Widmer may have been talking about McLarens, Lamborghinis, and Ferraris when he made his 10-year prediction, but the electrification of performance won't stop at supercars. Defying physics, the electrons are poised to flow into iconic performance cars where there's even more resistance. Hybridized 911s and BMW M3s are an eventuality, not just a possibility. This NSX is a preview of things to come.

For Acura, the hybrid system that supplements the 500-hp V-6 plays perfectly to the character of the NSX, both old and new. Just like the original, the modern NSX is every bit as civilized as it is quick. The open sightlines, the wide cabin, and the seats that accommodate the average American are as notable in this class as are the electric motors that give it instant off-the-line thrust. It's a supercar without a God complex, as unpretentious as a car with an engine behind the driver and a six-figure price on the window can possibly be.

More than any other modern car, the NSX is a product of whichever of its four modes—quiet, sport, sport-plus, and track—is active at the moment. Along with the usual calibration tweaks to the electrically assisted steering, adaptive dampers, and stability-control system, the NSX takes on a different persona depending on how it blends internal combustion and electric thrust.

[+] Alert chassis, signs of life at Acura.
[–] Electric assist smooths the drama out of 573 horsepower.
[=] The future of performance cars, still in beta.

NOT THAT SPORTY

Sport Mode

Because there's nothing "normal" about a 573-hp, torque-vectoring, gas-electric mid-engined Acura, engineers named the NSX's default street mode "sport." It strikes us as a misnomer, though, because getting the NSX to accelerate enthusiastically in this mode requires big, deliberate throttle inputs. It's best suited to urban settings, where the low-end torque of the electric motors—two up front and a third, larger unit mated to the engine—pulls the NSX off the line faster than traffic, but without spinning the engine much beyond 3000 rpm.

The chassis is always awake even if the powertrain isn't. With $1960 worth of Pirelli P Zero Trofeo R tires gluing the wheels to the pavement, our test car faithfully transmitted every minute steering input to the road regardless of the mode. Even as the steering weight ramps up with the more aggressive settings, the NSX turns in with zeal and precision. Most impressive, the NSX never belies its weight, no matter how fast the speed or how sharp the corner. Turns feel effortless, and as long as the pavement is smooth, the body remains flat.

That body is as much a hybrid as is the powertrain. It's made primarily of aluminum castings, stampings, and extrusions, but the A-pillars, roof beams, and windshield header are all made of steel, meaning there is more ferrous metal in the body of this NSX than in the 27-year-old original. The front floorboards are the only structural carbon-fiber bits, although $21,600 will buy just enough carbon fiber to reskin the roof, engine cover, splitter, sills, diffuser, and spoiler as seen on our $202,960 test car. The outer panels are a mix of formed aluminum and molded plastics.

NOT THAT QUIET

Quiet Mode

Compared with the mild-mannered sport mode, quiet mode is the self-effacing, almost apologetic way to pilot a low-slung, Valencia Red Pearl–painted, origami supercar through a crowd; it kills the V-6 whenever possible. It is not, however, a truly silent mode. The engine still fires when you start the car in quiet mode, though it revs only as high as the 1500-rpm fast idle and sounds as fierce as a Honda Odyssey minivan warming its catalysts. Once the powertrain is hot, quiet mode largely behaves like an aggressive stop-start system.

If you were expecting to slice through town with the swift, mute moves of a Tesla, you'd be disappointed. With a small lithium-ion battery pack (Acura will only say its capacity is "approximately one kilowatt-hour") and less than a Honda Civic's worth of horsepower from the electric motors, the NSX rarely gets above walking speed without firing the engine. It prefers to ride the 3.5-liter V-6 to cruising speed and then sail on electrons up to 50 mph when the road is flat or downhill.

Quiet mode doesn't soften the suspension or lighten the steering. It's merely a dimmer switch for the gas engine, shifting more work to the electric motors and exercising the battery harder. The NSX rebuts any attempts to drive hard in this mode. It disables the paddle shifters and causes the transmission to short-shift at 4000 rpm when the accelerator is pegged. And while quiet mode turns down the volume both inside and outside the car by closing the exhaust bypass valves and the intake resonator pipe, it hardly feels tranquil from the driver's seat. The constant on-off-on of the engine quickly becomes tiresome.

Below: Our test car arrived with $11,860 worth of tire and brake upgrades. The base NSX wears iron brake rotors and less aggressive summer tires.

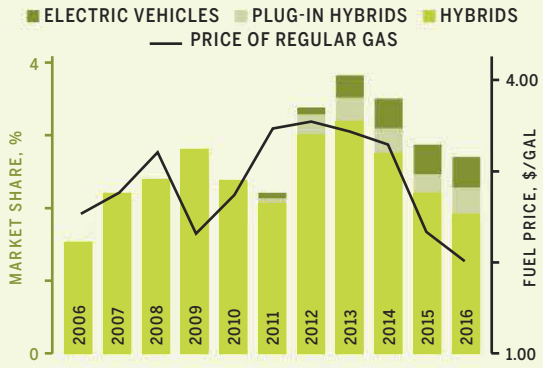
Rewiring the Car

The new NSX is only the latest example of an automaker choosing to electrify a car for performance, for efficiency, for the easy, seamless thrust of an electric motor. Seventeen years after the aphidian Honda Insight emerged, more than 50 electrified alternatives offer as much variety in form and purpose as the greater car industry. That diversity reflects a market growing beyond government mandates.

Fuel-economy standards and zero-emissions-vehicle regulations incubated modern hybrids, plug-in hybrids, and electric vehicles, but falling battery costs, rising performance, and expanding infrastructure will hatch the market that takes the technology mainstream. On the following pages, we detail the forces that are rewiring the automobile as we know it.

Over a Barrel

At the moment, though, demand for these alternative powertrains has slowed. Partially and fully electric vehicles currently account for less than 3 percent of U.S. auto sales in their third year of declining market share. Blame cheap gas for the recent dip. Over the past 10 years, the market for electrified vehicles has generally followed the trend of fuel prices, lagging behind by one year. In 2012, gas reached its highest average price in the past decade at $3.55 for a gallon of regular. Hybrid, plug-in hybrid, and EV market share peaked the next year with just less than 600,000 of the 15.5 million vehicles sold. With gas prices on the cusp of dropping below $2.00 per gallon for 2016, the electrification movement won't be getting any help from the oil industry anytime soon. —*ET*



2016 data covers January through July
Sales data: HybridCars.com, fuel prices: U.S. Energy Information Administration

WAKING UP THE NSX

Sport-Plus Mode

The obvious panacea is sport-plus, in which the gas engine never shut off and we never saw the nine-speed transmission shift higher than sixth gear on its own accord. Sport-plus redraws the tachometer to cover 9000 rpm, rather than 8000, but the redline remains unchanged at 7500 rpm, which is also where the boosted V-6 makes its peak 500 horsepower.

The engine's unusual 75-degree V angle results in a shorter and thus strengthened crankshaft relative to a 60-degree design, and a narrower overall width compared with a 90-degree unit. Forged internals include the crankshaft, connecting rods, and valves. Fuel is injected alternately into either the combustion chambers or the intake ports to maximize both power and efficiency. Yet the engine never sounds nor drives as exotically as it reads on paper.

That's the side effect of performance-enhancing electric motors. They smooth the power delivery to the point that they mask the full contribution of the gas-fed engine. Flatten the accelerator and the NSX stirs the motors, the turbos, and the reciprocating pistons into a cascade of low-end torque, midrange boost, and high-end power. If you could separate the sensation from the intake-resonance tube singing just behind your skull, it would evoke the initial torque swell of an electric vehicle with the seemingly endless pull of a 9000-rpm Porsche. Even during part-throttle shifts, gear-changes register strictly audibly, with the motors masking the momentary blip in gas-engine torque. Our VBOX test equipment, which logs data 100 times per second, failed to detect any slackening in the speed trace when the transmission shifted.

The engine-cover designer apparently grew up loving Jiffy Pop. The stiffer of the two suspension settings is a bit much for public-road driving.

Left in automatic mode in sport-plus, the gearbox will downshift under braking, though not very aggressively. The transmission prefers to keep revs between 3000 and 4000 rpm, and it feels more natural to find the right gear on your own with the paddle shifters. Even then, the transmission often denies the final downshift into first gear as you slow for a stop sign, and it's only as you stomp on the accelerator that you discover the aggravation of still being in second.

Acura resisted the temptation to provide a separate damper calibration for every drive mode, which is fine by us. The Germans often get mired in creating a different but similarly compromised tune for each drive mode. Based on feel alone, Acura's two settings use a fairly narrow portion of the bandwidth afforded by magnetorheological dampers, with one position covering sport-plus and track modes and a softer tune for quiet and sport.

While the softer position nicely balances ride quality and body control, the stiffer position proved too much on our 10Best loop. The NSX skipped over lumpy sections, the engine revs surging and sagging as the rear tires shifted between light and loaded, which is unsettling busyness that saps confidence. Sport mode's more compliant damping kept the body planted and allowed a faster pace over the same stretch of road. Unfortunately, there's no way to decouple the damper settings from the drive mode.

SUPERCAR DEMEANOR, ENGAGED

Track Mode

In track, the NSX begins to reveal some slightly raw edges and finally begins to feel like what it is—a mid-engined supercar. It's the rare car that will crash into the rev limiter, rather than automatically upshift during launch-control runs with the trans in manual mode. Track provides a tame launch with a relatively soft clutch engagement from 2500 rpm and no wheelspin, but there's no mistaking the smeared landscape for anything other than speed. Sixty mph arrives in 3.1 seconds, and the quarter-mile requires just 11.2.

Those figures are plenty quick, but the competition seems to challenge Widmer's assertion that "the reason we have electrification is for performance." In our August 2016 "Junior Achievement" comparison, the NSX's rivals—the Audi R8 V-10 Plus, the McLaren 570S, and the Porsche 911 Turbo S—all delivered quicker acceleration without any electric assist. And they did so carrying at least 150 pounds less each.

What will it take to flip the switch on EVs?

Cheaper Batteries

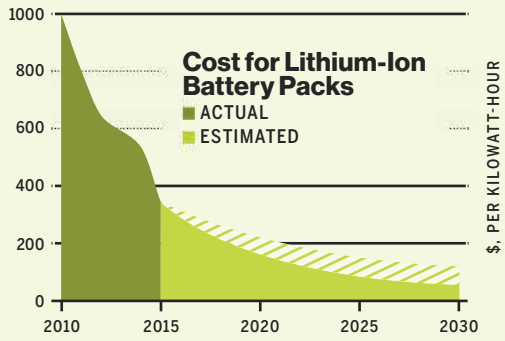
One hundred and fifty dollars. That's the magic number—the price for one kilowatt-hour's worth of lithium-ion battery capacity—at which experts believe electric vehicles can become cost competitive with internal-combustion vehicles. The math requires several assumptions and approximations, but it generally goes like this:

According to Navigant Research, an internal-combustion powertrain (engine, transmission, and axle) costs between $4000 and $7000 per vehicle, and those figures will only rise with fuel-economy standards. "Over the next decade, we expect that range to increase by $1000 to $2000 as you add new emissions aftertreatment like particulate filters for direct-injection engines, 48-volt hybrids, and advanced multispeed transmissions," said Navigant Research senior analyst Sam Abuelsamid.

At $150 per kWh, a 50-kWh pack could deliver 200 miles of range for $7500. Add in $1500 to $2000 for a motor, power electronics, and a single-speed gearbox, and an EV could reach cost parity without today's tax credits. EVs also benefit from lower operating costs, a roughly $1000 annual advantage.

The $150 mark is hardly guaranteed. It's difficult enough to pinpoint lithium-ion battery costs today, let alone a decade from now. Jon Bereisa, who worked on the EV1 and the Chevrolet Volt during his 35 years with GM, estimates that the Chevrolet Bolt's 60-kWh pack is priced at $215 per kWh. Tesla's head of investor relations, Jeff Evanson, claims Model S battery packs cost $190 per kWh, although that figure might be derived via Tesla math—accounting that often ignores R&D and capital investments.

Either way, the final $50 or so per kWh may be the most difficult to find. No one predicts significant leaps for today's lithium-ion technology. Instead, cost reductions will be found in economies of scale and manufacturing improvements. Tesla's Gigafactory is a $5 billion battery-building chisel that could chip away up to 30 percent of a pack's cost if it comes together as planned by 2020. Abuelsamid predicts that EV and gas-vehicle costs will intersect shortly after that, in the mid-2020s. *—ET*



Source: Bloomberg New Energy Finance

Better Infrastructure

More than 60 years ago, President Eisenhower's Grand Plan laid the foundation for the Interstate Highway System that opened the country to the automobile. The shape of vehicles changed, and American life in the 20th century was redefined.

With several 200- and 300-mile electric vehicles slated to arrive in the next two years, today's parallel to a pre-interstate America is our lack of a cohesive fast-charging infrastructure for EVs. If battery-electrics are to replace gasoline-fed vehicles, we'll need a national, automaker-agnostic network of direct-current Level 3 fast charging, which will restore 75 to 100 miles of range in just 30 minutes.

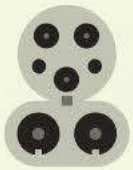
Tesla's Supercharger network of fast-charging stations is the best approximation of that vision for now. With thoughtful spacing of stations and a consistent interface, it comes the closest to providing the American "tank of gas" cadence. In about the time it would take to gas up and have lunch—roughly 45 minutes—a Tesla can recharge to drive another couple hundred miles, as many times as your family and fatigue permit.

For the foreseeable future, drivers of electric vehicles from other automakers face a very different experience, with a sometimes-maddening amalgam of chargers run by separate charging networks, using varied hardware [see Ezra Dyer, p. 030]. There's also not much consistency among interfaces, with some of the chargers only accepting membership cards and fobs for proprietary networks.

Automakers, arguably the largest beneficiaries of a national charging network, haven't stepped in to institute a better way. Instead, they've divided the infrastructure by promoting two competing charging standards and connectors, with Asian automakers supporting CHAdeMO and the Europeans and Americans favoring the Combined Charging System (CCS). Those systems typically charge at 50 kW, well below the 135 kW that most Tesla Superchargers are capable of providing, although both standards look ahead to 150-kW charging. That higher power level would allow a 250-mile EV to regain its charge in half an hour, versus about 80 minutes with 50-kW charging.

As in 1954, our best hope for a national infrastructure plan likely lies with the government. This past summer the White House announced a partnership between the Department of Transportation and the Department of Energy that will assess charging-station locations, study faster charging up to 350 kW, and form "a 2020 vision for a national network of fast-charging stations for EVs in order to facilitate coast-to-coast, nationwide zero-emissions travel." That network can't come fast enough, as we're not willing to give up the one thing that's quintessentially American: the freedom of the open road. *—Bengt Halvorson*

Betamax vs. VHS, 2017 Edition



CHAdeMO
Vehicles: KIA SOUL EV, MITSUBISHI i-MiEV, NISSAN LEAF
Typical Power: 50 kW
Number of U.S. Connectors: 1919

COMBINED CHARGING SYSTEM
Vehicles: BMW i3, CHEVROLET BOLT EV, CHEVROLET SPARK EV, VOLKSWAGEN E-GOLF
Typical Power: 50 kW
Number of U.S. Connectors: 1061

TESLA SUPERCHARGER
Vehicles: TESLA MODEL S, MODEL X
Typical Power: 135 kW
Number of U.S. Connectors: 2010

2017 ACURA NSX

PRICE

AS TESTED **$202,960**
BASE **$157,800**

VEHICLE TYPE: mid-engine, front- and mid-motor, all-wheel-drive, 2-passenger, 2-door coupe
OPTIONS: carbon-ceramic brakes with black calipers, $9900; carbon-fiber exterior package, $9000; carbon-fiber roof, $6000; Valencia Red Pearl paint, $6000; carbon-fiber engine cover, $3600; carbon-fiber rear spoiler, $3000; interior carbon-fiber package, $2900; Pirelli P Zero Trofeo R tires, $1960; semi-aniline leather and Alcantara power seats, $1500; Alcantara headliner, $1300
AUDIO SYSTEM: minijack, 2 USB, and Bluetooth-audio inputs; Android Auto and Apple CarPlay interfaces; 8 speakers

ENGINE

twin-turbocharged and intercooled V-6, aluminum block and heads
BORE X STROKE ..... 3.58 x 3.52 in, 91.0 x 89.5 mm
DISPLACEMENT ..... 213 cu in, 3493 cc
COMPRESSION RATIO 10.0:1
FUEL DELIVERY SYSTEM: port and direct injection
MAXIMUM BOOST PRESSURE ..... 15.2 psi
VALVE GEAR: double overhead cams, 4 valves per cylinder, variable intake- and exhaust-valve timing
REDLINE/FUEL CUTOFF ..... 7500/7500 rpm
POWER ..... 500 hp @ 7500 rpm
TORQUE ..... 406 lb-ft @ 2000 rpm

FRONT MOTORS (EACH)

2 permanent-magnet synchronous AC
POWER ..... 36 hp @ 4000 rpm
TORQUE ..... 54 lb-ft @ 0 rpm

MID MOTOR

permanent-magnet synchronous AC
POWER ..... 47 hp @ 3000 rpm
TORQUE ..... 109 lb-ft @ 500 rpm

NET SYSTEM POWER ..... **573 hp**
NET SYSTEM TORQUE ..... **476 lb-ft**

BATTERY PACK

lithium-ion, air-cooled
CELL COUNT/CONSTRUCTION 72/prismatic
CAPACITY ..... 1.0 kWh

DRIVETRAIN

FRONT TRANSMISSION: 1-speed direct drive
FINAL-DRIVE RATIO 8.51:1
REAR TRANSMISSION: 9-speed dual-clutch automatic with manual shifting mode
FINAL-DRIVE RATIO 3.58:1
ALL-WHEEL-DRIVE SYSTEM: full time with an electrically driven front axle, clutch-type limited-slip rear differential

GEAR	RATIO	MPH PER 1000 RPM	MAX SPEED IN GEAR (rpm)
1	3.84	5.9	44 mph (7500)
2	2.43	9.2	69 mph (7500)
3	1.78	12.7	95 mph (7500)
4	1.43	15.8	119 mph (7500)
5	1.21	18.6	140 mph (7500)
6	1.04	21.7	163 mph (7500)
7	0.88	25.3	190 mph (7500)
8	0.75	30.1	191 mph (6350)
9	0.63	35.5	180 mph (5100)

CHASSIS

spaceframe
BODY MATERIAL: aluminum stampings, carbon-fiber-reinforced plastic, sheet-molded plastic, and injection-molded plastic

STEERING

rack-and-pinion with variable ratio and variable electric power assist
RATIO 12.9–11.1:1
TURNS LOCK-TO-LOCK 1.9
TURNING CIRCLE CURB-TO-CURB ..... 39.7 ft

SUSPENSION

F: ind; 1 control arm, 1 diagonal link, and 1 lateral link per side; coil springs; 2-position electronically adjustable magnetorheological dampers; anti-roll bar
R: ind; 1 control arm, 1 diagonal link, 1 lateral link, and a toe-control link per side; coil springs; 2-position electronically adjustable magnetorheological dampers; anti-roll bar

BRAKES

F: 15.0 x 1.3-in vented, cross-drilled, ceramic disc; 6-piston fixed caliper
R: 14.2 x 1.3-in vented, cross-drilled, ceramic disc; 4-piston fixed caliper
STABILITY CONTROL ..... fully defeatable, traction off, competition mode, launch control

WHEELS AND TIRES

WHEEL SIZE ..... **F:** 8.5 x 19 in **R:** 11.0 x 20 in
WHEEL CONSTRUCTION ..... forged aluminum
TIRES ..... Pirelli P Zero Trofeo R
F: 245/35ZR-19 (93Y) **R:** 305/30ZR-20 (103Y)

EXTERIOR DIMENSIONS

WHEELBASE ..... 103.5 in
LENGTH ..... 176.0 in
WIDTH ..... 76.3 in
HEIGHT ..... 47.8 in
FRONT TRACK ..... 65.2 in
REAR TRACK ..... 63.7 in
GROUND CLEARANCE ..... 4.2 in

INTERIOR DIMENSIONS

SAE VOLUME ..... 55 cu ft
TRUNK ..... 4 cu ft

CAR AND DRIVER TEST RESULTS

ACCELERATION

ZERO TO	SECONDS
30 MPH	1.3
40 MPH	1.8
50 MPH	2.4
60 MPH	**3.1**
70 MPH	3.8
80 MPH	4.7
90 MPH	5.8
100 MPH	**7.0**
110 MPH	8.5
120 MPH	10.1
130 MPH	12.1
140 MPH	14.6
150 MPH	17.7
160 MPH	22.2
ROLLING START, 5–60 MPH	**3.6**
TOP GEAR, 30–50 MPH	2.2
TOP GEAR, 50–70 MPH	2.5
1/4-MILE	**11.2 sec @ 126 mph**
TOP SPEED	191 mph (mfr's claim)

HANDLING

ROADHOLDING, 300-FT-DIA SKIDPAD ..... **1.06 g**
UNDERSTEER ..... MODERATE

BRAKING, 70-TO-ZERO MPH

SHORTEST STOP ..... **142 ft**
LONGEST STOP ..... 144 ft
FADE RATING ..... NONE

WEIGHT

CURB ..... 3868 lb
PER HORSEPOWER ..... 6.8 lb
DISTRIBUTION ..... **F:** 41.9% **R:** 58.1%
CENTER-OF-GRAVITY HEIGHT ..... 18.5 in
TOWING CAPACITY ..... 0 lb

FUEL

CAPACITY ..... 15.6 gal
OCTANE ..... 93 (recommended)
EPA COMBINED/CITY/HWY ..... 21/21/22 mpg
***C/D* OBSERVED** ..... 17 mpg

INTERIOR SOUND LEVEL

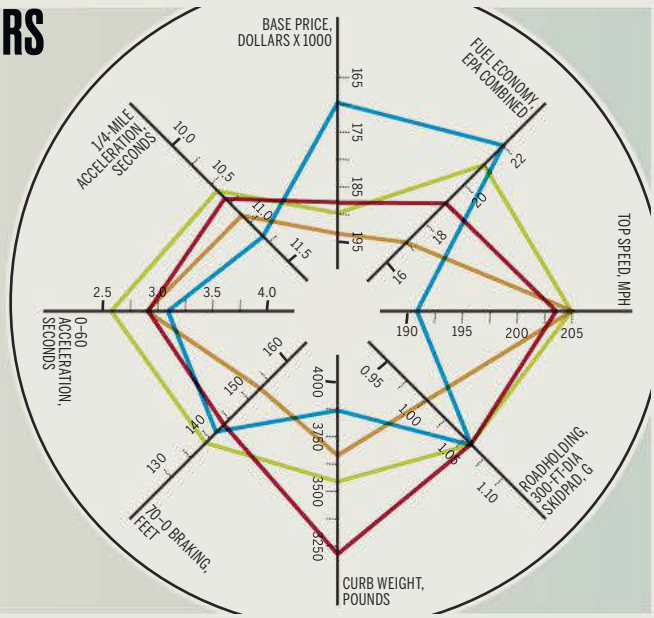
(QUIET/TRACK MODE)
IDLE ..... 32/57 dBA
FULL THROTTLE ..... 85/94 dBA
70-MPH CRUISING ..... 74/76 dBA

COMPETITORS

If it's fuel economy you want from your super sports car, the NSX has this field covered. Being battery-fortified, it's also the heaviest.

—

ACURA NSX
3.5-L V-6 + MOTORS, 9-SP AUTO
AUDI R8 V-10 PLUS
5.2-L V-10, 7-SP AUTO
McLAREN 570S
3.8-L V-8, 7-SP AUTO
PORSCHE 911 TURBO S
3.8-L FLAT 6, 7-SP AUTO



Shell V-Power NiTRO+ Premium Gasoline
The Official Fuel of CAR AND DRIVER

You can feel the NSX's urge relaxing near 120 mph as the two 36-hp front motors fade out. Their purpose is more sophisticated than simple straight-line speed, though. The motors do as much to turn the NSX as they do to accelerate the car, and they are never more effective at that task than in track mode. The NSX's relatively low-torque, front-axle vectoring makes for a decidedly different feeling compared with the rear-axle action we've come to know well. A torque-vectoring rear differential, like that found in a Lexus GS F, often provides a tightly controlled drift. In the NSX, the front motors simply pull the car down toward the apex, tightening the trajectory instead of increasing the car's slip angle. The effect is closer to breathing off the throttle rather than inducing power oversteer.

The NSX rarely wants to let its rear tires slip, and with 1.06 g's of lateral grip from the Trofeo Rs, it rarely wants to slide the front tires, either. The handling balance is practically as harmless as in any Acura sedan, which some might interpret as the ultimate dis from a car magazine. It's not intended as such here. You want a car that drifts every time you look sideways? Buy a V-8 Chevy Camaro. All-wheel drive and a mid-mounted engine are good at delivering buttoned-up composure. The NSX is no exception.

The NSX's 70-to-zero stopping distance measures a truncated 142 feet on the $9900 carbon-ceramic brakes. The braking system is essentially a brake-by-wire arrangement with pedal movement translated into electrical signals that are parsed to blend the regenerative braking from the electric motors and the clamping forces of the hydraulic calipers. The pedal is slightly springy when you stand on it, but otherwise it allays the common critique of hybrid brakes: that they are inconsistent and difficult to modulate. Once your foot is recalibrated to the feel, the NSX provides predictable and linear progression every time you go to the left pedal.

The hybrid powertrain is the single thin thread tying the NSX to the rest of the Acura showroom. There isn't a single legitimate sports sedan in the Acura lineup to bathe in the glow of the halo radiating from the NSX, and that seems unlikely to change anytime soon. Instead, Acura can only brag that the electric components are essentially a mirrored reflection of the system used in the RLX Sport Hybrid.

Acura could highlight the NSX's electric hardware if it would mimic Tesla's strategy of activating full regen braking when the driver lifts off the throttle, either in the less sporty driving modes or with a standalone, selectable option. One-pedal driving becomes another connection to the machine, allowing the driver to be an active participant in managing the battery charge and timing accelerator application with greater intention. If we were Acura, we'd consider it.

We apparently weren't too considerate with the right pedal, because we averaged 17 mpg in our time with the NSX, well off the NSX's 21-mpg EPA combined rating. While the 21-mpg city rating is unmatched by the competition, the 22-mpg highway rating is below that of the 570S and the 911 Turbo S.

The irony of the NSX is that it's far more impressive for its chassis than for the complex hybrid system that serves as its reason for being. Maybe that's because the handling really is that good. Or maybe it's because Acura is still searching for the perfect daily-use driving mode, somewhere between sport-plus and sport. You can be sure that Acura is in a race to perfect its hybrid system with multiple competitors currently prepping similar arrangements. Give it a few more years of development. But let's hope Acura keeps the chassis the way it is.

The Differences Between Hybrid and EV Batteries

The battery pack of an electrified vehicle isn't just a fuel tank for its motors. It's also a metaphorical fuel pump dictating the peak power that can be delivered to a motor. While electric vehicles require both range and power from the battery pack, hybrids require similar power with far less energy. Accordingly, the individual cells are optimized to deliver brief bursts of power in hybrids or long-lasting energy to maximize range for EVs. A plug-in hybrid's battery pack straddles both priorities and lands somewhere in the middle. A battery's output-to-storage-capacity ratio (what the industry calls its power-to-energy ratio, or watts per watt-hour) characterizes these differences.

"It's kind of like designing an engine," said Pablo Valencia, senior manager in global battery engineering at GM. "Am I trying to get high-speed power or am I trying to get fuel economy? Your piston-diameter-to-stroke ratio is one of the first fundamentals that you do in an engine design."

Battery engineers establish the power-to-energy ratio early in the design process by defining the thicknesses of both the current collectors and their chemical coatings. A hybrid's brief spurts of peak power mean higher electrical current, and higher current requires larger wires. The current collectors—aluminum or copper plates through which electrons exit and enter the battery—are a battery's internal analog to wires. Hybrids use thicker collectors than EVs to carry more current.

The opposite is true of the chemical coatings applied to the collectors. Thin coatings allow the electrons to flow through the battery quicker for higher power delivery in hybrids. EVs, with more individual cells, can discharge each cell more slowly through thicker coatings that help increase their energy capacity. These coatings are the secret sauces (such as lithium-manganese-oxide) that define the electricity-generating chemical reactions, but the chemistry is not critical to determining if the cell is more power- or energy-dense.

When batteries are connected in series, the voltage of each cell is cumulatively added; cells wired in parallel increase the capacity of a pack, adding the ampere-hours of each cell together. The pack is wired to achieve the necessary operating voltage and capacity, with more cells in parallel for plug-in vehicles. In the Chevrolet Bolt EV's pack, GM welds the tabs of three cells in parallel, then wires 96 of those triplets in series. A Volt plug-in hybrid uses pairs of cells wired in parallel, while all 80 cells in the Malibu hybrid's pack are wired in series. *—ET*

	MALIBU HYBRID	VOLT	BOLT EV
ENERGY CAPACITY	1.5 kWh	18.4 kWh	60.0 kWh
DISCHARGE POWER	52 kW	120 kW	140 kW
POWER-TO-ENERGY RATIO	34.7 W/Wh	6.5 W/Wh	2.3 W/Wh
PACK WEIGHT	95 lb	403 lb	948 lb
PACK VOLUME	1.4 cu ft	5.4 cu ft	10.1 cu ft
CELL COUNT	80	192	288
COOLING	Air	Liquid	Liquid
CELL SUPPLIER	Hitachi	LG Chem	LG Chem

Long-Term Test: When the tires get worn and the factory warranty runs out, that's where we come in. *Car and Driver* is your source for the 40,000-mile evaluation.

2015 VOLKSWAGEN GTI

Arrival: Feb/2015
Departure: Jul/2016

—

The car we'd all like to park in our driveways. See opposite. _by K.C. Colwell

We're no strangers to the usual flow of emotions that accompanies new-car ownership, even if the cars we test aren't ours. Whenever we get a new long-termer at 1585 Eisenhower Place, we feel that familiar sense of acquisitional pride. The car is new, it smells good, it feels taut, and climbing into it every day is as refreshing as a cold Fresca in the Sahara. Then, as the miles pile on, the small idiosyncrasies grow wearying, the bright glow of fresh metal dims, your dime turns into a nickel. We all get jaded, and hell hath no fury like a jaded automotive journalist.

But that didn't happen with our long-term 2015 Volkswagen GTI. We never tired of it. And that's because the car is simply *right*. All the controls are natural 10s: The electrically assisted steering is carefully weighted; the turbocharged 2.0-liter delivers lots of traffic-friendly low-end torque; the seats are comfortable and supportive; and the action of its six-speed manual, with a light clutch and an easy-shifting stick, reminds you how gratifying it is to row your own gears. From day one, this car was the golden child that could do no wrong.

Rants & Raves

"If you spent less than $30,000 on a fun car and didn't get a GTI, you screwed up."
—Jared Gall

"It does everything well—enough power, great handling, comfortable, and fantastic fuel economy."
—Jennifer Harrington

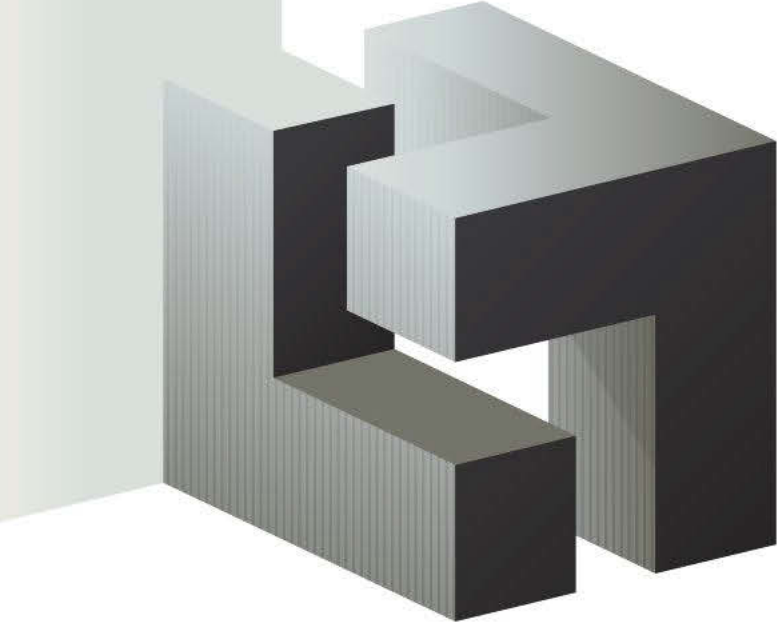


Exhibit A: The very first logbook comment declares the car "perfect," which is a very un-German descriptor. A perfect German car? This is not possible. Without room to improve, the engineers in Wolfsburg would put themselves out of a job. That said, over seven generations of improvement, VW has made this car as close to perfect as any in the current market. It'll comfortably transport a family of four across the country, haul two bikes with its 53 cubic feet of max storage, or serve as an amusement-park thrill ride for one.

The best part is that the '15 GTI delivers this versatility starting at $26,205, which is why most editors on staff would buy a GTI as their daily driver were they spending their own cash. The base GTI comes equipped with satellite radio and heated seats. We chose a white exterior because of how the GTI's black and red exterior trimmings pop against the high-contrast background. VW throws in leather with the pricier SE and Autobahn trims, packages we might have opted for if we didn't prefer the character of the Clark plaid seats. We did spec the $1495 Performance package. It proffers an additional 10 horsepower via engine programming, for 220 total, and an electronically controlled limited-slip differential. Finally, the $995 Lighting package brings bixenon illumination, a major upgrade and worth the cost.

All in, our GTI cost $28,695, which is about the same as the long-term Mazda 3 we wrote about last month. Taking delivery in February 2015, we immediately installed four Bridgestone Blizzak WS80 winter tires for $788, and in that swap we may have screwed up the prescribed rotation of the summer tires, something we didn't notice until it was too late. We put the summer tires back on, and after a free-of-charge 10,000-mile service we sent the GTI to *C/D*'s California office, at which point it was nearly ready for its 20K service. The Los Angeles dealer performed most of the

photography by MARC URBANO

recommended duties, including cabin and engine air-filter changes, while sneaking in a $13 "fuel additive" and omitting the tire rotation. By this point, the front rubber was worn; we had a hard time believing the tires were ever rotated at all, because the rears still had 80 percent of their tread.

We ate the cost of two new Bridgestone Potenza S001 summer tires and threw them on the rear axle, putting the best tires in the rear to avoid the risk of uncontrollable oversteer. After that, the tires wore evenly. The second half of the test revealed a more representative estimated tire life of about 30,000 miles.

Initial testing returned only so-so acceleration performance, with a zero-to-60-mph time of 6.1 seconds and a quarter-mile pass taking 14.6 seconds at 100 mph. We've recorded 5.8 and 14.4, respectively, in other GTIs. More importantly, though, the GTI hung on to the skidpad at 0.93 g and stopped from 70 mph in 156 feet. Those chassis scores are the real reason the car is lust-worthy. Without them, there would be no spunky handling that inspires its drivers to use the car to its potential. We're mostly mature enough that we won't drag-race any stanced Honda Civics; we'd much rather have the GTI's compliant ride and astute handling than a quicker, torque-steering monster.

Despite its legacy as a hot hatch, the GTI is also a pretty efficient car, averaging 29 mpg over its stay with us, which is 12 percent better than our long-term '14 Ford Focus ST ["Juvenile Delinquent," February 2015]. On longer trips—like those to California, upstate New York, and Asheville, North Carolina—the highway mileage was regularly 35 mpg or better.

As good as the GTI felt at 40,000 miles, it didn't have a completely trouble-free stay. Some Los Angeleno decided they needed UV protection so badly that they broke the driver's-side window to avail themselves of our sunglasses. Replacing the window cost $235, but the scattered glass revealed that the high-quality, tightly woven carpet eases cleanup by not trapping rough-edged debris.

We have no complaints about this long-term-er's handling, comfort, packaging, or basically anything else. This is a novel and welcome sensation for us.

The GTI's small details—such as the carpet, the rattle-damping felt-lined door pockets, and the perfectly shaped flat-bottomed leather steering wheel—bolster its desirability. Some other cheap speed machines, Focus and Fiesta STs for example, concentrate solely on going quicker, sometimes overlooking the gratifying minutiae that slowly become evident over time. You wouldn't think it, but an interior pull-down handle to avoid touching a dirty hatch is a much-appreciated feature. As is the ability to seek radio stations with a tap of your thumb on the steering-wheel control.

But the one place VW missed is the GTI's smartphone integration. It lacks a simple USB port. Instead, it has both iPhone-specific and generic USB con-

Rants & Raves

"I realize I am in the minority in the Golf/GTI versus Mazda 3 debate when I say I prefer the Mazda. However, the Golf is an excellent car in every configuration."
—Jeff Sabatini

"I can't come up with any negatives for this 10Best champion, my only wish being that I owned one."
—Zeb Sadiq

"Next to the BMW M2, the GTI feels, and is, slow. But the steering is superior to the M2's. The GTI's light clutch and light-effort shifter make it an amazing manual for stop-and-go hell."
—Tony Quiroga

Service Timeline:
Taken for a ride.

Key: O - Repairs O - Damage O - Maintenance O - Normal Wear O - Oil Additions

February 23, 2015
146 miles: GTI arrives in Ann Arbor. Bridgestone Blizzak WS80 tires fitted for winter

April 16, 2015
3079 miles: Summer tires reinstalled

July 13, 2015
O **10,925 miles:** The factory picks up the first oil change and inspections, $0
O The dealer makes minor adjustments to the shifter after we complain that it is sliding into reverse rather than first gear, $0

July 29, 2015
O **12,096 miles:** Chip in windshield repaired, $50

August 23, 2015
15,392 miles: GTI departs Michigan for an extended Southern California vacation

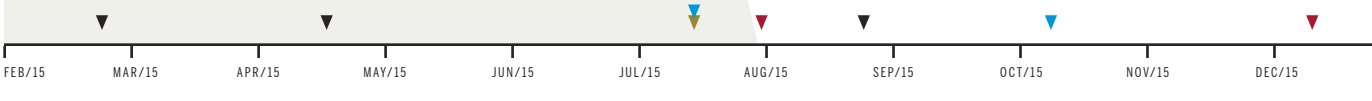
October 7, 2015
O **21,330 miles:** While the 20,000-mile service calls for an oil change, engine air filter, and tire rotation, Volkswagen of Downtown Los Angeles takes it upon itself to pour in fuel additive, top off the washer solvent, and "install battery cleaner," $270

December 9, 2015
O **24,181 miles:** Front tires replaced because rotations were not performed during prior service visits, $579

January 3, 2016
O **25,769 miles:** Replace driver's-side window smashed by New Year's Eve vandals, $235

February 20, 2016
28,895 miles: Winter tires fitted for the drive back to Michigan

February 25, 2016
O **29,424 miles:** Oil change, $74
O Dealer attributes a persistent humming at highway speeds to the winter tires, $0



"IF THERE IS ANYTHING OF CONSEQUENCE WRONG WITH THIS CAR, I FAIL TO SEE IT."

—DANIEL PUND, DEPUTY EDITOR

IP PHOTOGRAPH BY MICHAEL SIMARI

nectors emerging from a single port in the covered bin ahead of the shifter. Besides being difficult to swap out, the connectors are frustratingly short and have such large bases that any protective case your phone might wear has to be removed to accept a charge. VW seems to have recognized this as well, because starting in 2016, along with a revamped infotainment suite, GTIs ditched the proprietary connectors for a USB port in the same location. Many of us simply relied on Bluetooth audio to broadcast our playlists.

We ran the GTI up to 25,000 miles without so much as a mechanical hiccup. But when the car went to the dealer for its 30K service, we asked the desk to investigate an annoying 70-mph vibration from the front end and a rattle coming from the rear that sounded like an anti-roll-bar bushing going AWOL. The racket turned out to be due to an improperly placed cargo

March 9, 2016
32,131 miles: Winter tires rebalanced to address the highway-speed vibration

April 18, 2016
35,108 miles: Replace cracked windshield, $678

April 21, 2016
35,335 miles: Summer tires reinstalled

April 26, 2016
35,349 miles: The dealer looks into the slipping clutch and claims there is no problem, $0

May 3, 2016
35,488 miles: Back to the dealer for the humming noise reported at previous service. Right-front wheel bearing is replaced, $0

July 12, 2016
39,569 miles: Our 40,000-mile service includes an oil change, engine and cabin air filters replaced, plus a very expensive 32-point lube-and-adjustment procedure, $428

July 21, 2016
40,000 miles: GTI completes its duty in 17 months

TOTAL COSTS

MAINTENANCE	$772
NORMAL WEAR	$0
REPAIR	$0
DAMAGE AND DESTRUCTION	$1542
GASOLINE (@ $2.67 PER GALLON)	$3683

SERVICE

DEALER VISITS (SCHEDULED/UNSCHEDULED)	4/2
DAYS OUT OF SERVICE	6
UNSCHEDULED OIL ADDITIONS	0 qt

floor, which is movable to one of two heights, allowing for a flat surface with the seats folded. Initially, the dealer said that the winter tires caused the front-end vibration. Once spring rolled around, and with the summer tires reinstalled, the vibration was still there. The dealer replaced the right-front wheel bearing under warranty, successfully vanquishing the shimmy.

A few editors felt the clutch slipping late in the test, particularly in hard first-to-second gearshifts. When it was inspected, neither we nor the dealer could recreate the slippage, so we took no action. We blame the combination of a driver not using the dead pedal and the GTI's feathery clutch and high bite point. In most cars, resting your foot on the clutch has no effect. In the GTI, just the slightest pedal pressure initiates clutch disengagement.

Final testing returned slightly laggier acceleration than when the car was new, with the 60-mph sprint and quarter-mile time growing by 0.1 and 0.2 second, respectively. But in this car, those times couldn't matter less; the GTI could be a 7.0-second-to-60-mph machine and we would still reserve a permanent driveway space for it. You might consider doing so, too. We promise that you won't grow tired of it.

Rants & Raves

"I kind of want to keep driving this car all day, maybe forever."
—Rusty Blackwell

"The Golfs/GTIs are the polar opposites of Mini's similarly priced small hatchbacks, understated from a styling perspective but full of substance."
—Dave VanderWerp

"If I were to buy a GTI, the Lighting package would be the only option. Not sure that 10 horsepower is worth the money."
—K.C. Colwell

"This is a true performance car, and it's rewarding even when puttering around town."
—Joseph Capparella

"Buying anything more expensive is purely discretionary spending. This car is *the* sweet spot."
—Eric Tingwall

"The height- and length-adjustable center armrest encapsulates the smart thinking this car represents."
—Alexander Stoklosa

2015 VOLKSWAGEN GTI

PRICE AS TESTED **$28,695**
BASE PRICE **$26,205**

VEHICLE TYPE: front-engine, front-wheel-drive, 5-passenger, 4-door hatchback
ENGINE TYPE: turbocharged and intercooled DOHC 16-valve inline-4, iron block and aluminum head, direct fuel injection
DISPLACEMENT ..... 121 cu in, 1984 cc
POWER ..... **220 hp @ 4700 rpm**
TORQUE ..... **258 lb-ft @ 1500 rpm**
TRANSMISSION ..... 6-speed manual
WHEELBASE ..... 103.6 in
LENGTH ..... 168.0 in
WIDTH ..... 70.8 in
HEIGHT ..... 56.8 in
CURB WEIGHT ..... 3125 lb

WARRANTY

3 years/36,000 miles bumper to bumper
5 years/60,000 miles powertrain
12 years/unlimited miles corrosion protection
3 years/36,000 miles roadside assistance
1 year/12,000 miles scheduled maintenance

MODEL-YEAR CHANGES

2016: Rearview camera is now standard equipment. USB port, Android Auto, and Apple CarPlay are added. Driver Assistance package (available on SE and Autobahn) includes adaptive cruise control, forward-collision warning, emergency braking, lane-departure warning, blind-spot monitoring, rear-traffic alert, and park assist.
2017: New Sport trim falls between S and SE trims. Performance package is no longer available on S trim. Emergency braking, blind-spot monitoring, rear-traffic alert, adaptive cruise control, and bixenon headlights are now standard on Autobahn trim, optional on S and SE. Driver Assistance package on Autobahn includes park assist, lane-departure warning, and auto high-beams.

CAR AND DRIVER TEST RESULTS

PERFORMANCE

ZERO TO 60 MPH:
NEW ..... 6.1 sec
40,000 ..... 6.2 sec
ZERO TO 100 MPH:
NEW ..... 14.6 sec
40,000 ..... 15.3 sec
ZERO TO 120 MPH:
NEW ..... 23.2 sec
40,000 ..... 23.9 sec
ROLLING START, 5–60 MPH:
NEW ..... 6.8 sec
40,000 ..... 7.0 sec
1/4-MILE:
NEW ..... 14.6 sec @ 100 mph
40,000 ..... 14.8 sec @ 98 mph
BRAKING, 70–0 MPH:
NEW ..... 156 ft
40,000 ..... 162 ft
ROADHOLDING, 300-FT-DIA SKIDPAD:
NEW ..... 0.93 g
40,000 ..... 0.93 g
TOP SPEED ..... 125 mph (governor limited)
EPA FUEL ECONOMY, COMBINED/CITY/HWY ..... 28/25/34 mpg
***C/D*-OBSERVED FUEL ECONOMY** ..... 29 mpg

LIFE EXPECTANCIES

(ESTIMATED FROM 40,000-MILE TEST)
TIRES ..... 30,000 miles
FRONT BRAKE PADS ..... more than 100,000 miles
REAR BRAKE PADS ..... more than 100,000 miles

WHAT BITS AND PIECES COST

HEADLAMP $1124
ENGINE AIR FILTER $25
OIL FILTER $11
WHEEL $273
TIRE $173
WIPER BLADES (FRONT PAIR/REAR) ..... $52/$18
FRONT BRAKE PADS $148

5-YEAR ESTIMATED COST OF OWNERSHIP

YEAR	❶	❷	❸	❹	❺	TOTAL
DEPRECIATION	$11,675	$1596	$1596	$1596	$2128	**$18,591**
FINANCING	$737	$583	$425	$262	$93	**$2100**
FUEL	$1448	$1397	$1422	$1448	$1500	**$7215**
INSURANCE	$2556	$2597	$2646	$2699	$2753	**$13,251**
TAXES AND FEES	$1558	$61	$59	$58	$54	**$1790**
MAINTENANCE AND WEAR	$0	$982	$78	$232	$1257	**$2549**
REPAIRS	$0	$0	$0	$0	$260	**$260**
TOTAL	**$17,974**	**$7216**	**$6226**	**$6295**	**$8045**	**$45,756**

Depreciation data from ALG. Based on 15,000 miles per year.

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- All-weather dual tread compound

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X-ice Xi3	Geolandar I/T G072	Discoverer M+S	RW11	Hakkapeliitta R2	Blizzak WS80	Blizzak DMV2	Latitude X-ice Xi2
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DR-33	Lovan	Icon	MGA	Warrior	Ranger	TKO	NEW Warlord
14" STARTS AT $84	15" STARTS AT $95	15" STARTS AT $96	15" STARTS AT $105	15" STARTS AT $89	15" STARTS AT $97	15" STARTS AT $99	17" STARTS AT $176

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TESTED

Missed It by That Much

Lighter and more powerful, the 2017 Honda **Accord hybrid** undershoots 50 mpg. _by Don Sherman

A TIDAL WAVE OF JAPANESE CARS soothed our pain throughout what revisionists call the Malaise Era. While beloved 510s, 240Zs, RX-7s, Celicas, and Supras of the 1970s are long gone, Honda's Accord survived and prospered to celebrate its 40th birthday this year. The 12.7 million cars sold in the States, not to mention a remarkable 30 10Best trophies, distinguish the Accord as a paragon of Japanese quality, value, and driving finesse.

The '76 Accord's convenience breakthroughs included a single key for the doors, trunk, and ignition, plus service reminders for oil changes and tire rotations. Today's spoiled buyers, however, demand more. To celebrate the Accord's birthday, Japanese engineers set a goal of bettering the 47-mpg combined rating (50 mpg city) achieved by the Accord hybrid sold here in 2014 and 2015. A 50-mpg combined target seemed within reach for the company that beat the Toyota Prius to the U.S. market with its 70-mpg Insight hybrid. (When the EPA revised its methodology in 2008, the Insight's highway rating dropped to 61 mpg.)

Honda moved production from Ohio to Japan to double the supply of cars and expand availability to every state. The 2016 Accords were facelifted, lightened, and stiffened. For 2017, hybrid chief engineer Koji Ninomiya added a slightly more powerful 2.0-liter Atkinson-cycle four-cylinder engine; smaller, lighter, and more-energetic motor/generators; a more compact lithium-ion battery pack; aerodynamic drag and friction reductions; and various driver assists and creature comforts. The new edition comes in three trim levels ranging from the base $30,400 model to the $36,790 leather-lined Touring edition we tested.

[+] Classic quality, value, and comfort virtues.
[–] Howls as if it has a CVT under full throttle, weak dynamics.

The major carryover is what Honda calls its two-motor hybrid system, combining combustion and electric-energy conversion with fixed drive ratios. The larger motor/generator (up from 166 to 181 horsepower) is permanently geared to the front wheels' differential. The 143-hp engine drives the generator supplying juice to the drive motor and the battery pack while also helping drive the wheels through a computer-controlled clutch on rare occasions.

photography by MARC URBANO

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Every journey in the Accord hybrid begins in its purring EV mode. With light accelerator pressure and sufficient charge in the 1.3-kWh battery pack, you can sneak past 60 mph for a mile or so. Then hybrid drive takes over with all three energy converters active. Lift off and the engine naps while the drive motor becomes a generator charging the battery. You can notch the shifter back to its B (braking) position to intensify regen. There's also an engine drive mode wherein a clutch connects the engine directly to the differential, but we found that configuration impossible to maintain for more than a second or two at highway speeds.

Considering all the effort invested in the Accord hybrid's revival, the gains are modest. We logged 35 mpg overall and a commendable 45 mpg on our highway-cruising test (beating the Toyota Camry hybrid SE by 3 mpg). And while this car trumps the previous Accord hybrid by 2 mpg in the EPA highway rating, also beating the Camry, Chevy Malibu, Ford Fusion, and Hyundai Sonata hybrids, Ninomiya-san's engineering team missed their 50-mpg bogey. That won't bust anyone's fuel budget, but the Honda Motor Company that created the original Accord and the groundbreaking first-generation Insight wouldn't have released this hybrid until it was armed to maim the 58-city-mpg Toyota Prius Eco.

Our trip to the track engendered additional frowns. Thanks to weight-saving measures, the luxurious Touring model we tested is 42 pounds lighter than the 2014 edition, but acceleration to 60 mph still requires the exact same 7.2 seconds, and the new hybrid is a tenth of a second and 1 mph slower in the quarter-mile. The top speed is a commendable 114 mph, also the same as before. Blame the Michelin low-rolling-resistance tires for the modest 0.81-g cornering grip (up 0.01 g) and the not-very-good-at-all 195-foot 70-to-zero stopping distance, which is 11 feet longer than before.

Loyal fans who consider the Accord a budget BMW have no business in this hybrid version. Leg the accelerator, and there's a CVT-like howl that could wake the comatose as engine speed and wheel speed are fully decoupled in series-hybrid operation. In spite of the fact that there is no CVT, this hybrid copycats moaning Priuses and Camrys, which are so equipped. Our sound meter reports a modest full-throttle noise increase over the 2014 model. Add to that no steering feel and a brake pedal that muffs the translation from electrical to friction deceleration. While we're griping, we must mention that using a touchscreen slider to control audio volume—now more or less across its lineup—is Honda's dumbest-ever idea. Fortunately, redundancy exists in the form of a steering-wheel rocker switch.

This hybrid is a bull's-eye for two buyer types: Green geeks who love hypermiling while tapping the econ, EV, and sport buttons to watch energy flow hither and yon in the cluster display; and mainstream shoppers looking for excellent mileage in an attractive, nicely made, easy-riding sedan. They will be impressed by the abundance of thoughtful touches Honda has added to its flagship, including Android Auto and Apple CarPlay connectivity, lane-keeping assist, active cruise control, anti-collision braking, and a side-view camera to ease lane-change neck twisting.

Everyone who takes a pass won't have to wait long for Honda's portfolio to offer alternatives. The Clarity line rolls out in a few months with a fuel-cell sedan followed by a plug-in hybrid and a battery-electric. The 10th-generation Accord arrives next year, sharing the current Civic's underpinnings and spawning a third-generation Accord hybrid. At Honda, the tidal wave of fresh product is perpetually cresting. We're looking forward to the next Accord hybrid.

Despite its greater combined horsepower and lighter weight, the new Accord hybrid is no quicker and only slightly more fuel efficient overall than the model it replaces.

2017 HONDA ACCORD HYBRID TOURING

VEHICLE TYPE: front-motor, front-engine, front-wheel-drive, 5-passenger, 4-door sedan
PRICE AS TESTED: $36,790
BASE PRICE: $30,440
POWERTRAIN: permanent-magnet synchronous AC electric motor, 181 hp, 232 lb-ft; DOHC 16-valve 2.0-liter Atkinson-cycle inline-4, 143 hp, 129 lb-ft; combined system, 212 hp
TRANSMISSION: 1-speed direct drive

DIMENSIONS

WHEELBASE: 109.3 in
LENGTH: 194.1 in
WIDTH: 72.8 in
HEIGHT: 57.5 in
PASSENGER VOLUME: 101 cu ft
TRUNK VOLUME: 14 cu ft
CURB WEIGHT: 3533 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 7.2 sec
ZERO TO 100 MPH: 21.1 sec
ZERO TO 110 MPH: 27.6 sec
ROLLING START, 5–60 MPH: 7.4 sec
1/4-MILE: 15.8 sec @ 89 mph
TOP SPEED: 114 mph (governor limited)
BRAKING, 70–0 MPH: 195 ft
ROADHOLDING, 300-FT-DIA SKIDPAD: 0.81 g

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 48/49/47 mpg
***C/D* OBSERVED:** 35 mpg

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Let's Go Places

Lotus's Opus

More powerful, practical, and refined than the Evora S, the **Evora 400** is probably the best Lotus ever. But in a world of Caymans and Corvettes, it's still a tough sell.
_by Josh Jacquot

LOTUS IS NOT FERRARI. It's not McLaren, and it's not Porsche. What it has in common with those companies is that it manufactures cars. Barely. Despite the well-faded glory of seven Formula 1 Constructors' Championships, Lotus's current struggle with solvency is real. In the last decade it has seen three CEOs, the creation and collapse of plans for five redesigned models, and a full year's delay in deliveries to the U.S. of the most promising car it makes. But finally, we've driven that car—the Evora 400, the latest in the Evora bloodline—and it is good.

Nine pounds of boost and air-to-water intercooling bring the output of the Evora's 3.5-liter Toyota-sourced V-6 to an even 400 horsepower and 302 pound-feet of torque—increases of 55 horsepower and seven pound-feet. A six-speed manual transmission and a Torsen limited-slip differential are standard equipment. A $2700 six-speed paddle-shifted automatic is optional, but those who choose two-pedal driving will do it without the Torsen diff. Inside, this is easily the best Lotus ever made, with optional leather or Alcantara and touch points that are more solid than before.

[+] Competent driver's car, Lotus exclusivity, Lotus eccentricity. [–] Doesn't feel 400 horses strong, Lotus eccentricity.

What matters about the Evora 400 is not Lotus's financial stability or its lighter-is-better ethos. What matters is the same thing that matters about every sports car: how it drives. Though it has a revised chassis [see tech highlight], the Evora moves with a confidence similar to that of every mid-engined Lotus since the 1966 Europa. However, it lacks the hyper-chipmunk nervousness of an Exige or Elise. The hydraulically assisted steering is light but honest, and its brakes are indifferent to abuse. Fraught with mid-engine char-

2017 LOTUS EVORA 400

VEHICLE TYPE: mid-engine, rear-wheel-drive, 2- or 2+2-passenger, 2-door coupe
BASE PRICE: $93,785
ENGINE TYPE: supercharged and intercooled DOHC 24-valve V-6, aluminum block and heads, port fuel injection
DISPLACEMENT: 211 cu in, 3456 cc
POWER: 400 hp @ 7000 rpm
TORQUE: 302 lb-ft @ 3500 rpm
TRANSMISSIONS: 6-speed manual, 6-speed automatic with manual shifting mode

DIMENSIONS
WHEELBASE: 101.4 in
LENGTH: 171.7 in
WIDTH: 74.2 in
HEIGHT: 48.4 in
PASSENGER VOLUME: 50/73 cu ft (2/2+2)
CARGO VOLUME: 23/6 cu ft (2/2+2)
CURB WEIGHT: 3200 lb

PERFORMANCE (C/D EST)
ZERO TO 60 MPH: 4.3 sec
ZERO TO 100 MPH: 10.4 sec
1/4-MILE: 12.8 sec
TOP SPEED: 174–186 mph

FUEL ECONOMY
EPA COMBINED/CITY/HWY: 19–20/16–17/24 mpg

tech highlight

PRAGMATIC POUND PROGRESS

Built without the economies of scale enjoyed by larger firms, Lotus's cars have always showcased raw ingenuity and resourcefulness. The Evora 400's new chassis is 6.6 pounds lighter than that of the outgoing Evora S's. It also offers better ingress and egress with sills that are 2.2 inches lower and 1.7 inches narrower, plus a footwell that is 3.3 inches wider. Yet it retains the same torsional stiffness as the previous Evora S chassis. The widened footwell uses stampings created through hot-formed quenching (HFQ), a process that presses heated aluminum sheets with cold dies. HFQ stamping allows deeper draws and thinner panels to enable parts and weight reductions. Sill-size reductions came through refining the design and thickness of the sills' bonded aluminum extrusions.

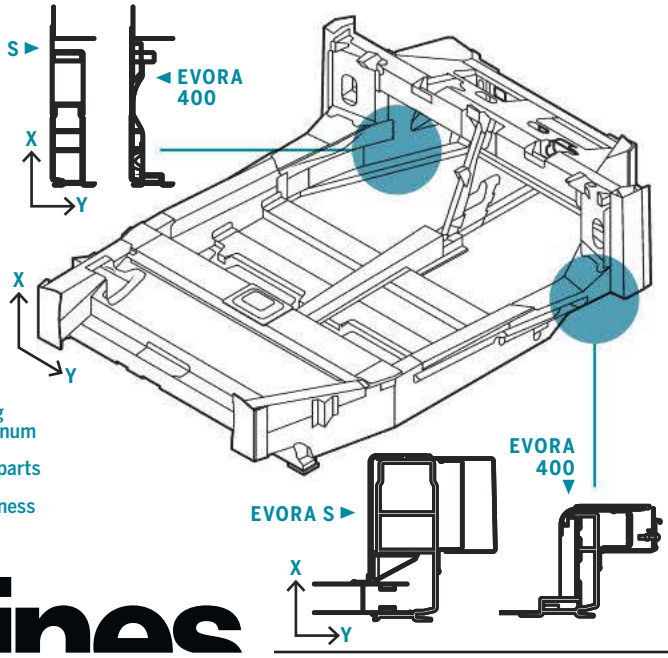

ILLUSTRATION BY CHRIS PHILPOT

Drivelines

photography by MARC URBANO

acter, its nose lifts in response to jabs at the throttle and dives slightly under heavy braking, yet the car won't spin without manipulation of the throttle and steering in search of such behavior. Understeer sets in mildly at the limit and is easily managed without risk. But the acceleration doesn't feel as strong as it should for a 3200-pound car with a power rating starting with a four.

New Evora 400s start at $93,785, more than a Porsche 718 Cayman S or a Chevy Corvette Grand Sport. Lotus makes a compelling case for its do-a-lot-with-a-little strategy, but when measured against the best, it's only occasionally better.

And that's the rub for Lotus. Independent of the obvious effort expended to make the Evora 400 a genuinely viable choice, the car comes with undeniable compromises—its performance value chief among them. But Lotuses always have. And, for some buyers, that's where the magic lies—not in the sacrifices in such trade-offs but in the benefits that accrue in return. An Evora 400 driver likely won't park next to another one, well, almost anywhere. There's always value in exclusivity, especially when it drives like this.

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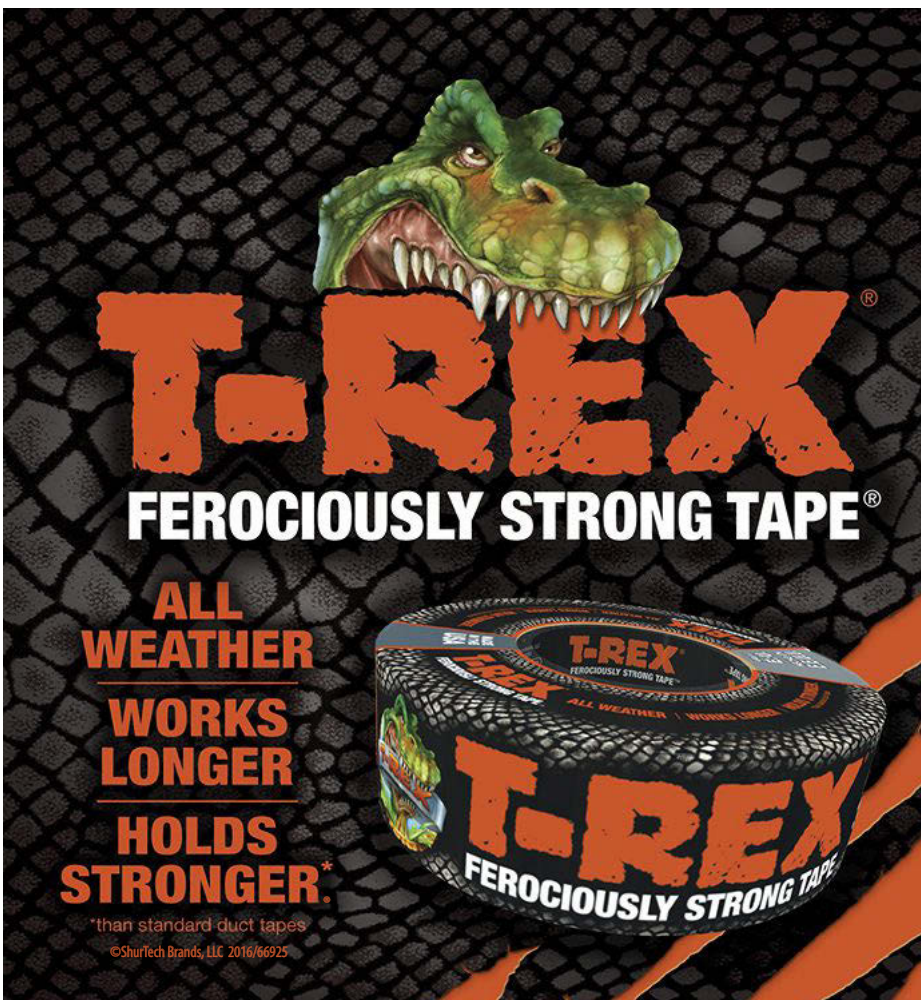

TESTED

An Armada on Patrol

The 2017 Nissan **Armada** joins the Infiniti QX80 on Nissan's global big-SUV platform. _by Joe Lorio

WHEN NISSAN CREATED its first full-size sport-utility vehicle, the Pathfinder Armada, it did so in the traditional way, using the platform of its full-size Titan pickup. Although there's now a new Titan pickup from which a new full-size ute could be spun, Nissan decided that worldwide volume for big, body-on-frame SUVs—which sell pretty much only in North America and the Middle East—could be accommodated by consolidating its offerings around the international-market Nissan Patrol. That vehicle, leather-lined and reengineered for a more pampered, pavement-oriented life, already is the basis for the Infiniti QX80, and now it has spawned the new Nissan Armada.

The styling changes from the Infiniti are evident mostly up front, where the Armada adopts a Nissan family face. And while we might have hoped to see the QX80's chrome fender trim disappear here, the driver's-side vent is actually functional (as an engine air intake), so the vents stay.

Peek inside the luxurious cabin and you might not notice any changes at all from the Infiniti. Padded surfaces abound, hard plastic has been all but banished, and the new Armada marks a wholesale upgrade in interior finery over its predecessor. Even the base SV comes with navigation, a 13-speaker Bose stereo, dual power seats, and a backup camera. The SL adds leather, power operation for the third-row seats, a power liftgate, and 20-inch wheels. The Platinum, tested here, brings a sunroof, heated and cooled front seats, seat heaters for the second row, and dual rear-seat entertainment screens, among other niceties. The Platinum also gets a full spate of driver-assist technologies, which are optional on the midline SL.

While luxe, the new cabin is smaller than before in most dimensions, although some of the previous model's space was largely wasted and served only to make the driver feel buried in a vast, plastic cavern. The new Armada doesn't feel as huge from behind the wheel, and it affords decent sightlines from the driver's seat. We also like that Nissan wisely supplements the standard touchscreen with plenty of physical buttons and knobs.

The second row is narrower than before but still offers generous head- and legroom. The standard third row is notably more cramped, having lost almost four inches of legroom and more than three inches of shoulder room from the previous model. Nissan still optimistically provides three seatbelts, but the cushion is low to the floor and foot room is tight. It's also a tough climb to get back there, even though the second-row seats scoot out of the way with the flick of a lever.

[+] Potent 390-hp V-8, plush interior, 8500-pound towing capacity. [–] Overboosted steering, smallish cargo hold, tight third row.

The cargo space also has shrunk from 20 cubic feet to 17 behind the third row. The full-size spare is tucked well up

photography by A.J. MUELLER

The near-comical hugeness of the old Armada is replaced here by mere bigness. Good by us, certainly, considering the new truck's greater refinement.

underneath for a better departure angle and, as a result, the load floor is nearly waist high. You'll find a more livable third row in the Ford Expedition and more cargo space in some three-row crossovers, such as the Ford Explorer and the Buick Enclave.

No crossover, however, can match the 8500-pound tow rating for all versions of the body-on-frame Armada. And a crossover isn't likely to be as capable off-road—even though the Armada isn't quite as hard-core in this regard as its foreign-market sibling. While the Patrol is a real rival to the Toyota Land Cruiser, with features such as locking front and rear differentials, those were left behind in the trip stateside (on the QX80 as well).

The Armada does come with a two-speed transfer case and a skid plate under the radiator and offers 9.1 inches of ground clearance. We trundled around a short off-road course with ramps and staggered breakovers steep enough to put a wheel—or two—off the ground, and the vehicle made it through without getting stuck or suffering any expensive scraping sounds.

A revised version of Nissan's 5.6-liter Endurance V-8, which was already under the QX80's hood, slots in here. With the addition of direct injection and variable intake-valve lift and timing, output jumps from 317 horsepower to 390, and torque swells from 385 pound-feet to 394. Those figures are still shaded by the Infiniti's 400 horsepower and 413 pound-feet, so the corporate hierarchy is maintained. The engine mates to a seven-speed automatic, which provides a wider ratio spread than the previous five-speed, with a shorter first gear and a taller top gear.

Unfortunately, the Patrol-cum-Armada is between 100 and 300 pounds heavier than the old Titan-based model, so fuel economy has barely improved, inching up by 1 mpg in the EPA city ratings; highway figures remain the same. More important, though, the 390 horses are up to the task of pulling this fancy carriage, and the smooth-shifting seven-speed automatic isn't lazy about downshifting. We clocked a 5.9-second zero-to-60-mph sprint in the Armada, which is 0.3 second quicker than the QX80. The engine note is a murmur; aided by its insulated windshield and front windows, this vehicle is a quiet cruiser.

The Armada uses the same control-arm front and independent rear suspension as the QX80, with steel springs (although the Infiniti's optional hydraulic body-motion control system is not offered here). We're told the Infiniti is tuned for a plusher ride, but the Nissan feels pretty soft, too. It smothers bumps, even on 20-inch wheels, and while we noted a bit of floatiness, it's far from unpleasant overall. But overboosted steering saps driver confidence, as there is no buildup of effort as you crank it off-center.

The new Armada lacks the cavernous cabin feel offered by most American big-box SUVs, and while it may seem more akin to the Toyota Land Cruiser, it can't match that vehicle's off-road heroics. But at an opening bid of $45,395 for an SV with two-wheel drive, the Armada is nearly $19,000 less expensive than the QX80, and even the Platinum tops out under the Infiniti's $64,245 starting figure. That's not as cheap as the outgoing model, but it's still something of a bargain among big SUVs, especially given the Armada's newfound refinement, which is positively Infiniti-like.

2017 NISSAN ARMADA PLATINUM

VEHICLE TYPE: front-engine, all-wheel-drive, 7-passenger, 4-door hatchback
PRICE AS TESTED: $61,435
BASE PRICE: $60,985
ENGINE TYPE: DOHC 32-valve V-8, aluminum block and heads, direct fuel injection
DISPLACEMENT: 339 cu in, 5552 cc
POWER: 390 hp @ 5800 rpm
TORQUE: 394 lb-ft @ 4000 rpm
TRANSMISSION: 7-speed automatic with manual shifting mode

DIMENSIONS
WHEELBASE: 121.1 in
LENGTH: 208.9 in
WIDTH: 79.9 in
HEIGHT: 75.8 in
PASSENGER VOLUME: 155 cu ft
CARGO VOLUME: 17 cu ft
CURB WEIGHT: 5910 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 5.9 sec
ZERO TO 100 MPH: 16.0 sec
ZERO TO 130 MPH: 33.9 sec
ROLLING START, 5–60 MPH: 6.1 sec
1/4-MILE: 14.7 sec @ 96 mph
TOP SPEED: 133 mph (governor limited)
BRAKING, 70–0 MPH: 182 ft
ROADHOLDING, 300-FT-DIA SKIDPAD: 0.74 g*

FUEL ECONOMY
EPA COMBINED/CITY/HWY: 15/13/18 mpg

**Stability-control inhibited.*

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tale of the tape

LARGENESS, GRAPHED

■ NISSAN ARMADA ■ CHEVROLET TAHOE ■ FORD EXPEDITION ■ TOYOTA SEQUOIA

PASSENGER VOLUME:
155 cu ft
162 cu ft
162 cu ft
154 cu ft
150 165

EPA COMBINED MPG (2WD/4WD):
16/15
19/18
18/17
15/14
20

CARGO VOLUME (MIN/MAX):
17 cu ft/95 cu ft
15 cu ft/95 cu ft
19 cu ft/108 cu ft
19 cu ft/120 cu ft
120

BASE PRICE:
$45,395–$60,985
$48,195–$65,935 (2016)
$47,420–$67,542
$46,420–$66,175 (2016)
70,000

TESTED

Bare Essentials

The **Porsche 911** has everything you need in its most basic form. _by Tony Quiroga

FEWER THAN ONE IN 10 new Porsche 911s has three pedals, which means the vast majority of 911 buyers are happy to shell out an extra $3200 to let a PDK dual-clutch automatic do the shifting. We get it. It's a great gearbox. PDK is quicker than the manual, it's easier to live with, and it's smart enough to make you look like an ace on a road course. And yet, to someone adept at shifting gears, letting PDK handle everything is like watching two computers play chess.

Thankfully, Porsche still lets us play with a shifter and clutch. We might lack the moves of Deep Blue, but there's joy in trying. Which leads us back to the fact that the manual Carrera isn't as quick to 60 mph as its PDK equivalent. Now, before you blame our shifting skills, know that it's mostly in the launch. Manual 911s won't rev past 4200 rpm with the clutch in and first gear selected. Therefore, the launch isn't as aggressive as the about-5000-rpm clutch engagement enabled by the PDK's launch control, which should really be renamed launch out-of-your-control.

[+] Boosted power, no-cost manual transmission, the least expensive 911. [–] Conservative launch strategy can't match PDK, the least expensive 911 is still expensive.

Turbos aren't just for 911 Turbos anymore. Both the Carrera and Carrera S share a new twin-turbo flat-six engine for 2017. The Carrera's lower-output version of the 3.0-liter gulps up to 13.0 psi of boost to produce 370 horsepower and 331 pound-feet of torque—20 more horsepower and 44 more pound-feet than the naturally aspirated 3.4-liter it replaces. That old engine's peak torque didn't arrive until 5600 rpm, and there wasn't much enthusiasm below 4000. Turbos fatten the engine's low-end grunt substantially, providing a serious shove from 2000 rpm on. The power delivery is strong and linear all the way to the 7400-rpm redline. At very low rpm there's a hint of lag as the turbos scramble to shove air into the engine, but the delay is short-lived. This Carrera is quicker and, more importantly, always feels stronger than the car it replaces.

As hard as it will be to find a new 911 with a do-it-yourself gearbox, it'll be nearly impossible to spot one that costs less than $100,000. It only takes a few options to swell the $90,450 base price to six figures, even if this stripped 911 stickered at $96,650. The priciest option on this Carrera is a $2950 sport exhaust that amps up the sound of the flat-six [see tech highlight]. Use the $3000 you saved by getting the manual to get the loud pipes.

Even in its basic form, the 911 has a 1.00-g chassis and the ability to stop from 70 mph in 145 feet. On the smaller 19-inch wheels there's slightly more tire sidewall, which lessens impact blows, but the steering is as sharp and talkative as it is with the 20s. A 911 without rear-wheel steering and active anti-roll bars lacks the supernatural stability of 911s equipped with those features. But with its manual gearbox and few options, this Porsche leaves the driver more directly responsible for the experience. You won't go out to the garage to find it playing chess with itself.

tech highlight

PUSH-BUTTON PERSONALITY

To make more sweet flat-six noise, the Carrera's optional sport exhaust uses two electronically controlled flaps to route the exhaust stream around some of the muffler baffles. Hit the exhaust button on the center console, and the flaps swing open. But even if you don't press the button, the exhaust flaps will automatically go loud above about 3300 rpm. At full throttle, there's a noticeable difference in the sound level because of the Porsche's Sound Symposer system. Sound Symposer consists of two tubes that connect the engine intake to a speaker-like diaphragm in the cabin. In "normal" mode, only one sound tube is enabled. Press the sport or sport-plus buttons, and a second sound tube is switched open, which further increases the engine sound inside the car by five decibels at wide-open throttle. Fortunately, the sport exhaust doesn't add any loudness at a steady 70-mph cruise in seventh gear, as the engine turns at less than 2000 rpm and the sound tubes to the engine remain relatively quiet at part throttle.

TEST RESULTS:
SPORT EXHAUST OFF/ON
WIDE-OPEN THROTTLE ..... 83/88 dBA
70-MPH CRUISE ..... 71/71 dBA

2017 PORSCHE 911 CARRERA

VEHICLE TYPE: rear-engine, rear-wheel-drive, 2+2-passenger, 2-door coupe
PRICE AS TESTED: $96,650
BASE PRICE: $90,450
ENGINE TYPE: twin-turbocharged and intercooled DOHC 24-valve flat-6, aluminum block and heads, direct fuel injection
DISPLACEMENT: 182 cu in, 2981 cc
POWER: 370 hp @ 6500 rpm
TORQUE: 331 lb-ft @ 1700 rpm
TRANSMISSION: 7-speed manual
DIMENSIONS
WHEELBASE: 96.5 in
LENGTH: 177.1 in
WIDTH: 71.2 in
HEIGHT: 50.9 in
PASSENGER VOLUME: 70 cu ft
CARGO VOLUME: 13 cu ft
CURB WEIGHT: 3229 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 4.0 sec
ZERO TO 100 MPH: 9.1 sec
ZERO TO 150 MPH: 21.5 sec
ROLLING START, 5–60 MPH: 4.9 sec
1/4-MILE: 12.4 sec @ 117 mph
TOP SPEED: 183 mph (mfr's est)
BRAKING, 70–0 MPH: 145 ft
ROADHOLDING, 300-FT-DIA SKIDPAD: 1.00 g
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 23/20/29 mpg
***C/D* OBSERVED:** 24 mpg

Shell V-Power NiTRO+ Premium Gasoline
The Official Fuel of CAR AND DRIVER

Drivelines

photography by WEBB BLAND

What owners say about V1...

★★★★★ *Bill P., Phoenix, AZ*

Where's the radar? An arrow lights up, pointing either Ahead, to the side, or Behind. And, amazingly, it's never wrong.

★★★★★ *Arnie R., Atlanta, GA*

So easy to operate, a box with one knob. No need to poke around at full-arm's reach for little buttons the size of rice grains.

★★★★★ *Glenna R., Dallas, TX*

Love the arrows! Where's the radar? They tell me every time. A detector without the arrows is like a car without headlights.

★★★★★ *Chas S., Charlotte, NC*

Situation Awareness you can trust. With the Radar Locator arrowing toward threats, and the Bogey Counter telling how many threats you face, V1 makes defense easy.

★★★★★ *Cal L., Trenton, NJ*

I've owned my V1 since 2001, and I've had it upgraded twice. I trust the arrows to point out every radar trap. When I know *where*, I know how to defend.

★★★★★ *Ed H., Las Vegas, NV*

How can anyone not be smitten by the Arrows? Radar ahead needs a different defense than radar behind. When I know where, I know what to do. When I put the threat behind me, the arrows confirm it. Without the arrows, you're guessing.

★★★★★ *Rob R., Sacramento, CA*

This is the slam dunk best radar detector. No databases to keep updating, or other "features" I'll never use. Instead V1 tells me the important stuff—the Bogey Counter tells you how many threats within range and the red arrows tell where they are.

Trust...V1 earns it one ambush at a time.

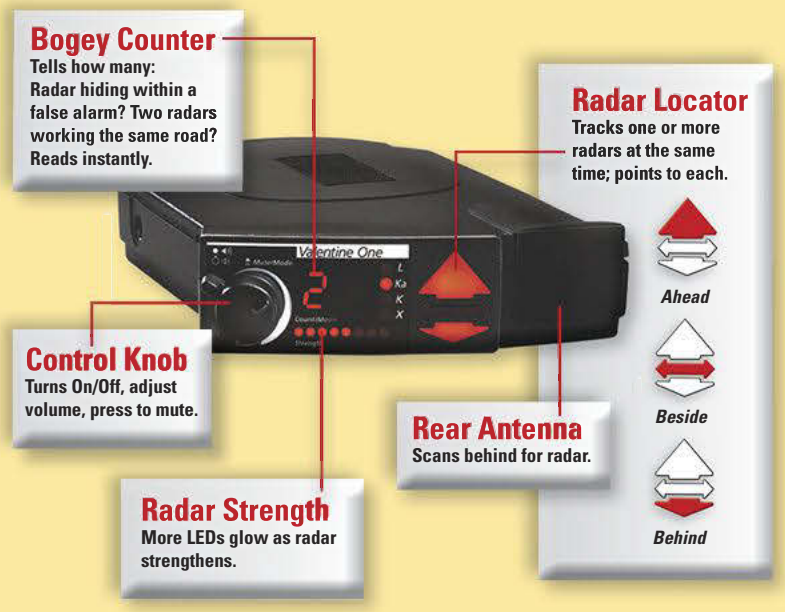
★★★★★ ***Harold B., Houston, TX***

On my way home this afternoon I was following another detector user. I could see red blinking in his windshield as we went past the first radar. Thinking the danger was behind, Mr. Ordinary Detector User hit the gas.

***Uh-Oh.* V1's Radar Locator was showing two arrows, one pointing toward the trap now behind, and a second arrow ahead. The "2" on the Bogey Counter confirmed we were being double teamed.**

Sure enough, Mr. O. D. User cruised into the second trap up the hill at 15 over and got himself a blue-light special.

V1 points to *every* trap. I trust it completely.



Mike Valentine
Radar Fanatic

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TESTED

Why? Job

Buick's 2017 **LaCrosse** is a mostly credible luxury sedan. Will anyone notice? _by Jeff Sabatini

[+] Camaro's V-6, handling with big-wheel package.
[–] Standard car is a cream-puff.

IT DID NOT TAKE A CRYSTAL BALL to predict that as Buick's old-line customers continued to die off and the brand courted younger ones the average age of its owners would drop. But no seer or spreadsheet, no pundit or product planner foresaw what has also come to pass: Buick is now predominantly a seller of SUVs. Thanks to the Enclave and Encore, a pair that didn't exist a decade ago but accounted for 58 percent of the brand's sales in 2015, Buick's longstanding reputation as a purveyor of cushy sedans is changing.

That has not stopped Buick from marching forward with the completely redesigned 2017 LaCrosse, a distillation of the two previous generations into an attractive and refined sedan that plays to the brand's strengths. It's comfortable and quiet, powerful and poised, and makes good on the premium image that Buick has been pitching for years. As well it should, given its price. The base MSRP is only $32,990, but to get leather upholstery and heated seats requires an outlay of at least $39,590. Further options such as nav, a sunroof, or sensor-based safety equipment—including blind-spot and rear-cross-traffic alerts and adaptive cruise—can drive the price deep into the $40K range.

The LaCrosse is down to one powertrain, and it's a good one: GM's corporate 3.6-liter V-6 bolted to an eight-speed transaxle. This redesigned six is a detuned version of the one used in the Chevy Camaro, producing 310 horsepower and 282 pound-feet of torque here, and with less aggression than in the pony car, though it's still good for a 5.9-second run to 60 mph. The eight-speed offers manual shifting via paddles but also employs the same convoluted electronic gearshift joystick used in the Cadillac XT5 [see prndl redo]. The new V-6 and a substantial reduction in curb weight net the front-drive LaCrosse a 3-mpg improvement in all three EPA estimates, including the 25-mpg combined rating, though the numbers still trail the eAssist mild hybrid offered last year. All-wheel drive is available again, but only as a $2200 option on the priciest $41,990 trim.

Our favorite LaCrosse is one fitted with 20-inch wheels and tires (instead of the standard 18s), Buick's HiPer Strut front suspension, and adaptive dampers. This $1625 option bundle on the top two trim levels transforms the car's attitude, adding a sport mode that starches up both suspension and steering. All LaCrosses use a multilink rear suspension and the structure feels stiff, but the base damper tuning is floaty and its steering is too light.

The big-wheel package gives the car much improved body control and a more precise helm, and, when it's switched into sport mode, the LaCrosse is even reasonably fun to drive through the moraines. In this configuration, it feels like a modern luxury car rather than a sop to Buick's fading demographic.

Sedans accounted for just 35 percent of Buick's sales through July, the popular potato-like Encore continuing to make hash of the car lineup. Buick has canceled the Verano and added the Envision crossover. A strong argument could be made that the LaCrosse is the best Buick sedan in decades, yet it's hardly the sort of product that's going to reverse this larger trend.

prndl redo

PARADIGM SHIFT

Like other carmakers, GM has seen fit to redesign the traditional PRNDL shift pattern for its new electronic gearshift selector. The General's big twist is that selecting reverse requires pushing the lever forward and then to the left while pressing a button on the side. Also, to prevent any tuck-and-roll exits, the transmission will shift itself from neutral to park in certain circumstances. We'd rather it just do what we ask. The new shifter, already fitted in the Cadillac XT5, will soon be appearing throughout GM's lineup.

2017 BUICK LACROSSE ESSENCE

VEHICLE TYPE: front-engine, front-wheel-drive, 5-passenger, 4-door sedan
PRICE AS TESTED: $44,850
BASE PRICE: $32,990
ENGINE TYPE: DOHC 24-valve V-6, aluminum block and heads, direct fuel injection
DISPLACEMENT: 223 cu in, 3649 cc
POWER: 310 hp @ 6800 rpm
TORQUE: 282 lb-ft @ 5200 rpm
TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 114.4 in
LENGTH: 197.5 in
WIDTH: 73.5 in
HEIGHT: 57.5 in
PASSENGER VOLUME: 103 cu ft
TRUNK VOLUME: 15 cu ft
CURB WEIGHT: 3730 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 5.9 sec
ZERO TO 100 MPH: 14.5 sec
ZERO TO 130 MPH: 31.4 sec
ROLLING START, 5–60 MPH: 6.1 sec
1/4-MILE: 14.5 sec @ 100 mph
TOP SPEED: 149 mph (drag limited)
BRAKING, 70–0 MPH: 173 ft
ROADHOLDING, 300-FT-DIA SKIDPAD: 0.83 g

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 25/21/31 mpg
***C/D* OBSERVED:** 24 mpg

Shell V-Power NiTRO+ Premium Gasoline
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Drivelines

photography by A.J. MUELLER

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Customer Rating ★★★½☆

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42080513

WOW SUPER COUPON

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ITEM 69249/69115/69137 69129/69121/877 shown

Customer Rating ★★★★★

$2.99

~~$4.99~~ comp at $8.48

42047388

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SUPER COUPON

SAVE $61

PITTSBURGH AUTOMOTIVE

RAPID PUMP® 3 TON HEAVY DUTY STEEL FLOOR JACK

ITEM 69227/62116 62584/68048 shown

Customer Rating ★★★★★

• Weighs 74 lbs.

$79.99 comp at $141.88

42051122

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SUPER COUPON

NEW

WARRIOR

29 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL DRILL BIT SET

ITEM 5889/62281/61637 shown

Customer Rating ★★★½☆

$12.99 comp at $59.97

SAVE 78%

42090408

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WOW SUPER COUPON

CENTRAL PNEUMATIC

3 GALLON, 100 PSI OILLESS PANCAKE AIR COMPRESSOR

ITEM 95275 shown 60637/61615

Customer Rating ★★★½☆

SAVE 49%

$49.99

~~$59.99~~

comp at $98.62

42077727

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SUPER COUPON

12" SLIDING COMPOUND DOUBLE-BEVEL MITER SAW WITH LASER GUIDE

CHICAGO ELECTRIC POWER TOOLS

SAVE $259

ITEM 69684 shown 61969/61970

Customer Rating ★★★★½

$139.99 comp at $399

42080558

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SUPER COUPON

• 1000 lb. capacity

Customer Rating ★★★★★

MOVER'S DOLLY

HaulMaster

ITEM 60497/93888 shown 61899/62399/63095/63096 63098/63097

$7.99 comp at $19.97

SAVE 59%

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WOW SUPER COUPON

NEW

120 LED RECHARGEABLE UNDER HOOD WORK LIGHT

ITEM 60793

Customer Rating ★★★★★

lumiWORK 41½"

SAVE $120

$29.99 ~~$39.99~~ comp at $150

42078029

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WOW SUPER COUPON

44", 13 DRAWER INDUSTRIAL QUALITY ROLLER CABINET

• Weighs 245 lbs.

US•GENERAL PRO

ITEM 69387 62744/63271 68784 shown

$359.99 ~~$379.99~~

SAVE $670

Customer Rating ★★★★★

comp at $1029.99

42076683

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SUPER COUPON

9 PIECE FULLY POLISHED COMBINATION WRENCH SETS

Customer Rating ★★★★★

SAVE 70%

SAE	METRIC
ITEM 63282	ITEM 42305
69043	69044
42304 shown	63171

PITTSBURGH

YOUR CHOICE $5.99 comp at $19.97

42080731

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SUPER COUPON

RECIPROCATING SAW WITH ROTATING HANDLE

Customer Rating ★★★★★

SAVE 59%

CHICAGO ELECTRIC POWER TOOLS

ITEM 61884 62370/65570 shown

$23.99 comp at $59

42071420

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SUPER COUPON

PREDATOR GENERATORS

SUPER QUIET

Customer Rating ★★★★★

4000 PEAK/3200 RUNNING WATTS 6.5 HP (212 CC) GAS GENERATORS

• 70 dB Noise Level

ITEM 63079/69729 63080/69676 shown

SAVE $179

ITEM 69675/69728 63090/63089 CALIFORNIA ONLY

$289.99 comp at $469

42094317

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SUPER COUPON

HARDY

Customer Rating ★★★★★

POWDER-FREE NITRILE GLOVES PACK OF 100

• 5 mil thickness

SIZE	ITEM
MED	68496/61363
LG	68497/61360/97582
X-LG	68498/61359

SAVE 62%

Item 68498 shown

YOUR CHOICE $5.99 comp at $15.99

42079811

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SUPER COUPON

COVERPRO

Customer Rating ★★★★★

10 FT. x 20 FT. PORTABLE CAR CANOPY

ITEM 63054/60728 69034/62858 shown

NEW

SAVE $106

$99.99 comp at $205.99

42042973

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. . . to Revelation

Conservative yet competent, the **G90** flagship sets the tone for Genesis's second chapter. _by Mike Sutton

IN AUTOMOTIVE TERMS, Genesis is the name of Hyundai's newly independent luxury brand. Once merely a model name for Hyundai's aspirational cars, it has now fully separated from the mother ship and is striving for a Lexus-like rise to prominence. There will be six models in the lineup by 2021, and the rechristening of the Hyundai Genesis sedan as the Genesis G80 was the first platinum-plated stake in the turf. This is a fine starting point, since the G80 is the best-driving Hyundai to date. But for the affluent to consider Genesis in the same thought bubble as, say, Mercedes-Benz, a grand flagship is required. Enter the G90 sedan, which presents as a solid yet decidedly simpler alternative to established luxury liners.

The fleet of G90s astride the curbs of our hotel in Vancouver, British Columbia, seemed fit for a cadre of visiting dignitaries. The sculpting is elegant if a bit generic, but the car is large, affording it an undeniable presence. And that mien doesn't change based on optional equipment, because, unlike every other luxury brand's offerings, there is no optional equipment. Everything's pretty much standard. Okay, maybe that's not strictly accurate: The car offers two engine choices, one upscale trim level, and an available rear-biased all-wheel-drive system—but just one style of 19-inch alloy wheels with all-season tires, along with mostly gray-scale exterior colors.

[+] Composed handling, sweet V-6, comes fully loaded.
[–] No brand heritage, visible Hyundai roots, no sizzle.

Based on an enlarged version of the G80's rear-wheel-drive platform, the G90 measures within an inch or two in overall dimensions of its long-wheelbase competitors, most notably the Mercedes S-class and the Lexus LS. Although Genesis claims that the G90's steel structure is lighter and stiffer than the Benz's body in white, it's no featherweight. Only some suspension components are aluminum, and curb weights approach 5000 pounds.

While Genesis has tuned the G90's ride and handling to feel similarly competent to the G80's, which was fettled by Lotus Engineering, the setup prioritizes posh cruising above all else. The smooth Canadian roads

2017 GENESIS G90

VEHICLE TYPE: front-engine, rear- or all-wheel-drive, 5-passenger, 4-door sedan
BASE PRICE: $69,050–$70,650
ENGINES: twin-turbocharged and intercooled DOHC 24-valve 3.3-liter V-6, 365 hp, 376 lb-ft; DOHC 32-valve 5.0-liter V-8, 420 hp, 383 lb-ft
TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS
WHEELBASE: 124.4 in
LENGTH: 204.9 in
WIDTH: 75.4 in
HEIGHT: 58.9 in
PASSENGER VOLUME: 113 cu ft
TRUNK VOLUME: 16 cu ft
CURB WEIGHT: 4700–4950 lb

PERFORMANCE (*C/D* EST)
ZERO TO 60 MPH: 5.6–6.0 sec
ZERO TO 100 MPH: 13.0–14.5 sec
1/4-MILE: 14.0–14.5 sec
TOP SPEED: 150 mph

FUEL ECONOMY
EPA COMBINED/CITY/HWY: 18–20/15–17/23–24 mpg

The best part of the new Genesis G90 full-size luxury sedan is that it looks and rides nothing whatsoever like that baroque float-boat, the Hyundai Equus.

of our drive route never ruffled the big car's composure. If the G90 had champagne flutes in its aft quarters, there would be no spillage. The brake pedal feels satisfyingly firm and short in travel, and body motions are kept nicely in check by driver-adjustable Sachs/ZF dampers, which vary ride quality from cushy to somewhat flinty without letting the suspension crash on its bump stops. There's nice heft to the electrically assisted steering and security in the car's certain on-center tracking. But the G90's tiller is there for steering duties, not entertainment.

We spent most of our time in the starter 3.3T Premium model powered by Hyundai's 365-hp twin-turbocharged V-6 [see sidebar], a smooth-if-uninspiring powerplant that never labored to move the G90's girth. More important, its 376 pound-feet of torque from 1300 rpm afford whip-snap response and big thrust.

Stepping up to the 5.0 Ultimate trim brings Hyundai's silky 5.0-liter Tau V-8 with 420 horsepower and 383 pound-feet of torque. While the V-8 is more indulgent than the V-6, with a refined snarl befitting a big luxury car, its straight-line kick isn't much greater. Expect the V-8 to reach 60 mph in the mid-five-second range, with V-6 models not far behind.

Hyundai's own eight-speed automatic is the only transmission, operated via an electronic joystick shift lever and steering-wheel-mounted paddles that respond lazily to inputs. While automatic upshifts come a bit too quickly at times, gearchanges generally occur in the background without any frantic shuffling of ratios.

A button on the center console selects from four drive modes (smart, sport, eco, and individual) that alter the car's character from relaxed to slightly energized by adjusting the aggressiveness of the dampers, steering, throttle response, and transmission. We found the default setting, called smart, to be the optimal one, its programmed logic adapting to our inputs for a happy medium between the lethargic eco and the harsher sport modes.

The G90's stately cabin is a model of comfort, offering configurable mood lighting and lots of room to stretch out. There's a power sunroof and supple leather on the dash, doors, and seats, as well as real wood, aluminum, and stainless-steel trim. The driver's throne adjusts in no fewer than 22 different ways and is eminently supportive, while the vivid 12.3-inch central display is intuitively navigable. Highlighted by a simple rotary controller and lots of smartly arranged buttons and knobs, the G90's ergonomics are excellent, even if some of the switchgear is the same as a low-buck Hyundai Elantra's. The only upgrades come with the V-8's Ultimate trim level, which swaps the Premium's bixenon headlights for LEDs and adds a power-adjustable rear seat.

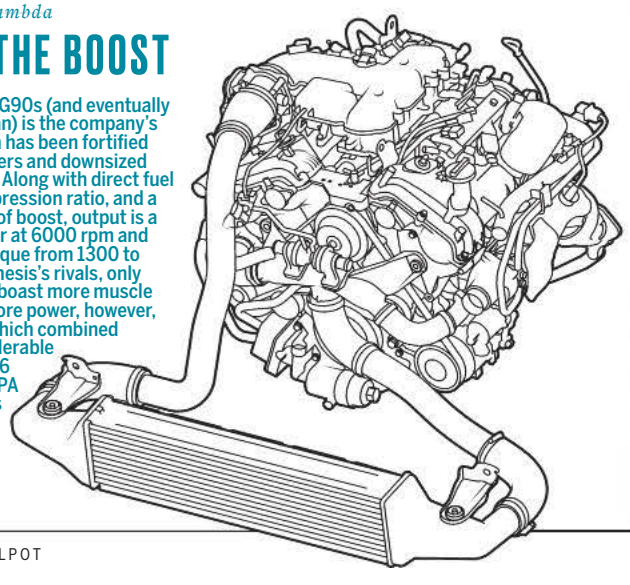
Genesis furthers the G90's all-in formula with a full-color head-up display, three years of complimentary maintenance, and nearly every active safety feature extant. Conspicuously absent: a panoramic sunroof, massaging seats, and a separate rear-seat entertainment system, all of which you can get in some pickups.

Though the Genesis G90 lacks a sense of occasion behind the wheel and doesn't recalibrate the segment, its $69,050 cost of entry does give it a considerable price advantage over similarly equipped competitors. In a class rife with à la carte configurations and custom flourishes, the new premier brand hopes that its less pretentious take on the high-end sedan will alleviate some decision-making stress for those customers more concerned with enjoying luxury than with flaunting it.

Lambda Lambda Lambda

SHOW ME THE BOOST

Powering entry-level G90s (and eventually a smaller sports sedan) is the company's 60-degree V-6, which has been fortified with twin turbochargers and downsized from 3.8 liters to 3.3. Along with direct fuel injection, a 10:1 compression ratio, and a maximum of 17.4 psi of boost, output is a stout 365 horsepower at 6000 rpm and 376 pound-feet of torque from 1300 to 4500 rpm. Of the Genesis's rivals, only the Cadillac CT6 can boast more muscle from six cylinders. More power, however, requires more fuel, which combined with the G90's considerable weight means that V-6 models carry lower EPA fuel-economy ratings than other luxury barges powered by boosted sixes.



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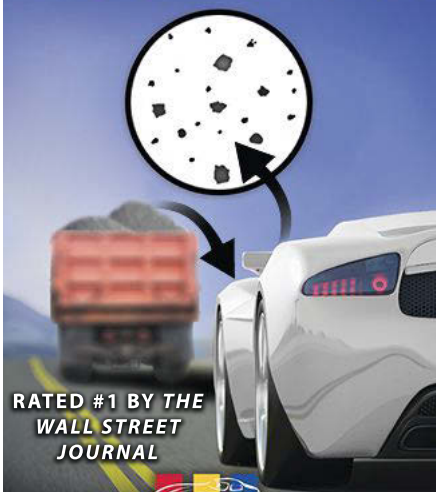

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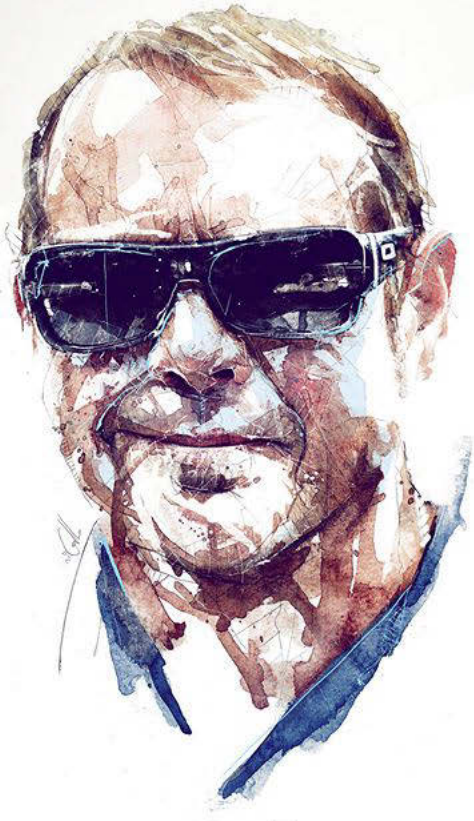
What I'd Do Differently
Chad McQueen, 55

Chad McQueen recently co-produced the documentary *Steve McQueen: The Man & Le Mans*, chronicling the out-of-control production of the 1971 movie *Le Mans*.

► *interview by* PETER MANSO



C/D: ***Did your father make you into a car nut?***

CM: Growing up, there were always my dad's cars and motorcycles around . . . a Jag XKSS, Lotus Eleven, and Cooper Formula Junior. I started riding motorcycles when I was six and racing at nine, and he came to every race, just as he made sure my sister and I were with him whenever he'd be on location. He'd coach me, "You can go in deeper here" or "You don't need to brake so hard there." Remember, my dad came out of a shaky background, and I think I benefited from the neglect his mom had shown him. He never knew his father, his mother drank a lot, and at one point a judge put him in a place called Boys Republic, where the motto still is "Nothing without labor." He told me they turned his life around.

■ ***How many of his cars do you have now?***

☐ Only a few, all Porsches—a '58 Speedster, a '69 2.0-liter 911, and a twin-plug 2.2 '71 that's my canyon scalpel.

■ ***In the* Le Mans *documentary, you speak of racing as the "best drug" there is.***

☐ Absolutely, any race driver will tell you the same thing. It's a high. The way you feel after you finish a day's driving, there's this great sense of achievement that registers as a real calmness, and while it's happening, God, the adrenaline!

■ ***Was your Daytona accident that left you comatose for three and a half weeks the end of your racing career?***

☐ Yeah. I had something like nine surgeries. But I finally got a historic license so I've recently been playing, driving a friend's 904 GTS. Even now, though, my right eye is slightly toed-in as the result of the accident, so I have a little trouble with right apexes.

■ ***Your documentary succeeds, ironically enough, where* Le Mans *itself failed at the box office for lack of a story line. Here the story is how your dad sacrificed all to make the definitive racing film.***

☐ I was only 10, but I remember how after screening dailies he'd show clips from *Grand Prix* to show what he didn't want to do. What he cared most about was what the racers thought, which is what he was trying to share. Unfortunately, they couldn't get anything on the page that was his vision. Director John Sturges also had a vision—he wanted racing as a backdrop, so there was a conflict.

■ ***But it all centered on his being so immersed?***

☐ First, I think that he wanted to be an endurance driver himself. He saw drivers as a different species, a different breed, and almost winning Sebring with Peter Revson in 1970 only made him want to be one of those guys more—another Brian Redman or Derek Bell, both of whom he got to know well during the shoot. He had all these guys working on the film, so it was a complete, total involvement. I remember that he used to piss on James Garner's flowers—Garner lived near us in Brentwood—because Garner had beat him to the punch with *Grand Prix*, which he saw as hokey.

■ ***He saw racers as more "authentic," more real, than actors and film executives?***

☐ He loved racers. *Le Mans* was his homage to those guys, and just how important it was to him can be measured by the fact that he showed the film to the staff down at the clinic in Rosarito Beach while he was ill, toward the end.

■ ***Was your dad more the racer or the actor?***

☐ The racer, no question.

■ ***While making the film, he did all his own driving in a 917?***

☐ Correct. Derek Bell talked to me once about their running through Maison Blanche flat-out—Jo Siffert leading, my dad in the middle, with Derek bringing up the rear, and my dad couldn't lift because Derek was right behind him. Supposedly, he was white as a sheet when he climbed out. But, again, he loved it.

■ ***Was Cinema Center, the studio that took the film away from him when Steve kept rejecting scripts, helpful to you?***

☐ Absolutely. My dad had shot a mile of film for *Le Mans* that, so far as anyone knew, had disappeared, but Paramount (Cinema Center's successor) gave it to us. Listen, for a 45-year-old picture, *Le Mans* has turned out to be not just a cult classic but a moneymaker. My dad could have left when the film was taken away from him, but he stuck because he knew they'd shot footage that could be put together into something really great. And he was right. But the other thing I should tell you is that even though my dad was prevented from running Le Mans by the studio's insurance company, he may actually have driven in the race behind everyone's back. I got an email from an English guy who was next door to the Solar pits when they were filming the race and he swears that after midnight, after all the hubbub had died, he saw my dad hop into the 908 camera car and drive a stint.

■ ***Finally, what if anything would you do differently?***

☐ Absolutely nothing.

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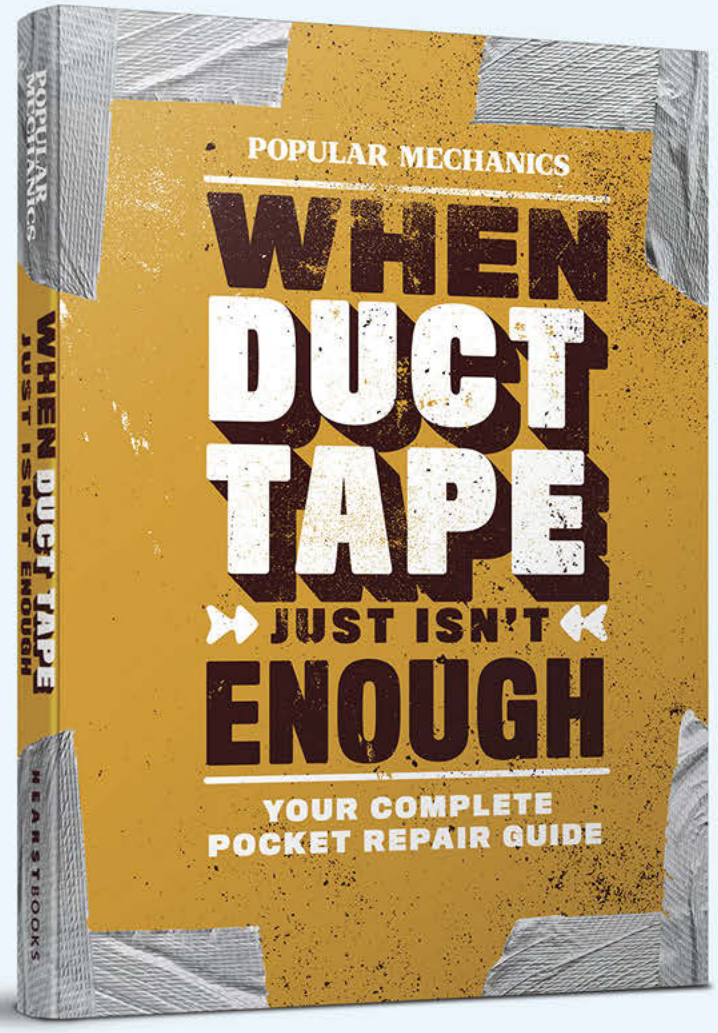

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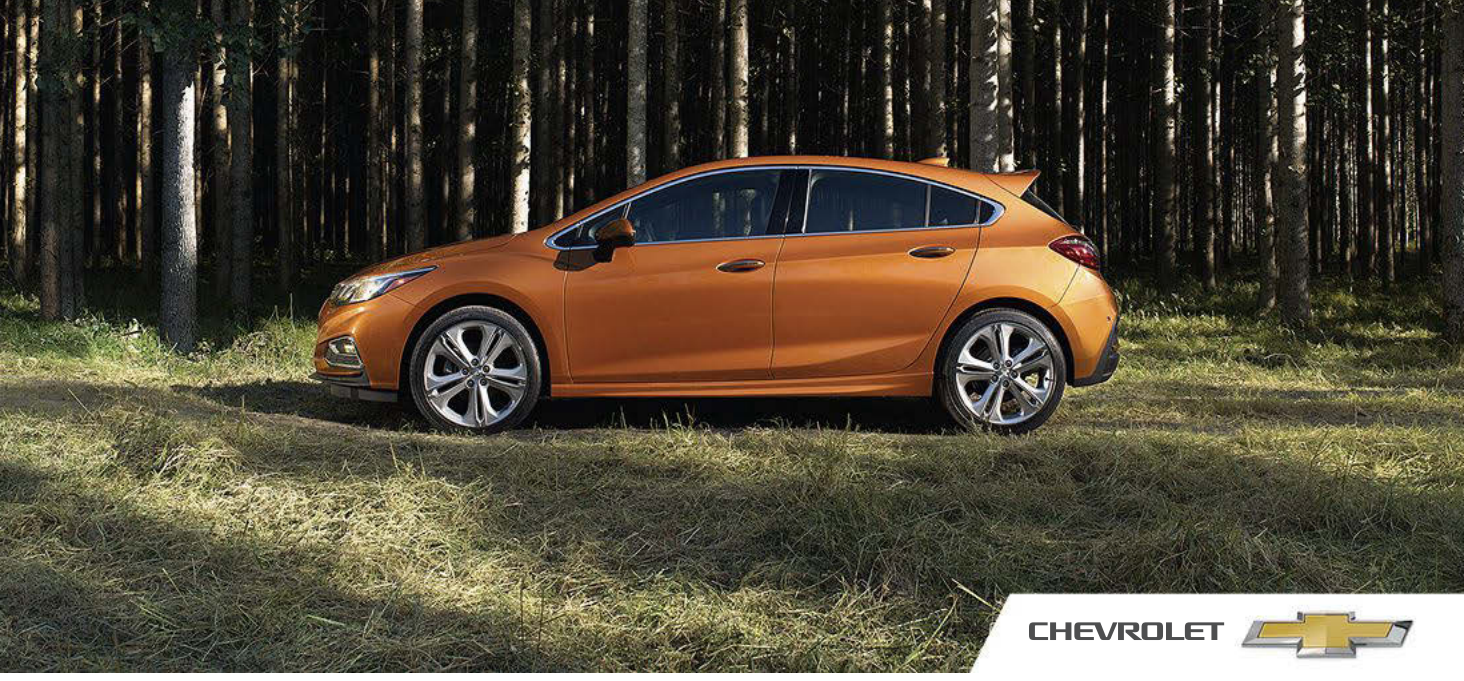

THE STORY OF THE 2017

CRUZE HATCH

FROM ONE OF THE DESIGNERS WHO BROUGHT BOLD DESIGN AND FUNCTIONALITY TOGETHER IN ONE SPORTY PACKAGE

We sat down with Exterior Design Manager Tim Kozub to find out how his team managed to get so much style and utility into the first-ever Cruze Hatch.

TIM KOZUB
EXTERIOR DESIGN MANAGER, CHEVROLET

What inspired Chevrolet to introduce a hatch version of the Cruze?

The hatch makes a strong design statement and Cruze Hatch offers expressive style. That was important. Many car designers I know would rather design a hatch than a sedan and that passion really comes through in this vehicle. The hatch style has always been popular in Europe and now we're seeing more American companies introduce hatch designs. The team has a global mind-set and we went in knowing that we were going to build a hatch version of Cruze — a very aggressive, sporty-looking version of the sedan.

Hatchbacks are known for utility. How did you design more utility into the Cruze Hatch?

Cruze Hatch was designed to provide more room for life's necessities. We talked with vehicle owners in the segment and they kept telling us they wanted more from cars this size. Everyone is looking for more utility and versatility. We're always working to increase functionality in our vehicles, so that was one of our goals from the beginning. And with the long overall length, we were able to achieve these goals in one sporty ride. When it comes to design, adding length helps. The hatch provides substantial leg room in the back seat and an impressive 47.2 cubic feet of cargo space[1] which can accommodate a wide variety of shapes and sizes people need for their daily adventures. The length of the vehicle also allowed us to run out the body lines a bit and create flowing, sculpted lines. The result is an aggressive, aerodynamic design that's pretty hot.

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